Region of Peel
Working for you

10 Peel Centre Drive, Ste A, 1st Fl, Rm 101
Brampton, ON L6T 4B9
Telephone: (905) 791-7800
Fax: (905) 791-3697

Request for Tender
(This is NOT a Purchase Order)

Document Number: 2013-714T **Total Number of Pages, including Cover Sheet:294**

Document Title: INTERIOR RENOVATION OF REGION OF PEEL PUBLIC HEALTH CLINIC AT 7205 GOREWAY DRIVE, MISSISSAUGA

Date Issued: Friday, January 3, 2014

Submissions must be made in accordance with this document and will be received at the office of the undersigned on or before:

12:00 noon local time
Wednesday, January 22, 2014

You are hereby invited to bid the lowest net prices for which you are prepared to furnish the merchandise or services described, all in accordance with the Terms and Conditions and other instructions as stated in this document.

Contact Name:
Glayton Campbell
Purchasing Analyst

Telephone Number:
(905) 791-7800, ext. 4211

Authorized Signature:
Campbell

Document 2013-714T
INTERIOR RENOVATION OF REGION OF PEEL PUBLIC HEALTH CLINIC AT 7205 GOREWAY DRIVE, MISSISSAUGA

Please submit your bid for INTERIOR RENOVATION OF REGION OF PEEL PUBLIC HEALTH CLINIC AT 7205 GOREWAY DRIVE, MISSISSAUGA, all in accordance with this Document's Index.

GRAND TOTAL $_____
(transferred from Form of Tender, pg. 44)

NOTES:
It is the Vendor's sole responsibility to ensure their submission is received by the time and date specified within the document.

SITE VISIT:
A mandatory site visit will be held at Westwood Square at 7205 Goreway Drive, meeting at Suite B7 and is scheduled for Thursday, January 9, 2014 at 1:00 p.m.

DOCUMENT SUBMISSION DEPOSIT: (formerly known as Bid Surety)
A Document Submission Deposit in the amount of $50,000 in the form of a Certified Cheque or Bank Draft (payable to the Regional Municipality of Peel) shall accompany your submission in order to be considered.

[COMPLETION, SIGNING AND SUBMISSION REQUIRED]

The Lowest Or Any Bid Will Not Necessarily Be Accepted

Company Name & Address:

Please return this cover sheet with your submission

DOCUMENT 2013-714T

INTERIOR RENOVATION OF REGION OF PEEL PUBLIC HEALTH CLINIC AT 7205 GOREWAY DRIVE, MISSISSAUGA

Interior Renovation of Region of Peel Public Health Clinic at 7205 Goreway Drive, Mississauga.

SEALED TENDERS, clearly marked as to contents and on forms supplied by Region of Peel, can be obtained and will be received by Purchasing, 10 Peel Centre Drive, Suite A, First Floor, Room 101, Brampton, Ontario, L6T 4B9, Telephone (905) 791-7800 ext. 4303, Fax (905) 791-3697, on or before:

12:00 noon local time
Wednesday, January 22, 2014

This Document is being made available to vendors electronically through the Region of Peel's website at www.peelpurchasing.ca.

Each tender must be accompanied by a certified cheque or bank draft in the amount of $50,000, and the successful vendor must provide a Performance Bond and Labour and Material Payment Bond by an approved guarantee company each for 50 per cent of the total tender.

NOTES:

The mandatory site visit will be held at Westwood Square at 7205 Goreway Drive, meeting at Suite B7and is scheduled for Thursday, January 9, 2014 at 1:00 p.m.

Tenders will be opened in public on closing date at 12:15 p.m. Please check with Purchasing on the first floor for location. The lowest or any tender will not necessarily be accepted.

It is the Vendor's sole responsibility to ensure their submission is received by the time and date specified within the document.

The list of plan takers may be viewed at Purchasing's Web page:
peelpurchasing.ca (then click 'Current Bid Documents')

NOTICE
The Region of Peel relies on this advertisement to notify you of this business opportunity and it is not obligated to notify past or present vendors, contractors, or service providers in any other manner.

The Region of Peel is aware of websites where Peel purchasing documents are being relayed, either free or for a fee. The relaying of Peel documents is being done without the Region of Peel's permission or collaboration, and any fees being charged are unrelated to Region of Peel processes and are not required in order to access the purchasing documents on the Region of Peel's website.

Region of Peel
Working for you

For **INTERIOR RENOVATION OF REGION OF PEEL PUBLIC HEALTH CLINIC AT 7205 GOREWAY DRIVE, MISSISSAUGA**, as required, and as specified within this Document.

1. Cover Sheet
   1.1 Advertisement

2. Index

3. Instructions to Vendors

4. Supplementary General Conditions to CCDC2 - 2008

5. Form of Tender
   5.1 Agreement to Bond

6. Specifications
   Division 1 General Requirements
   Division 2 Existing Conditions
   Division 6 Wood, Plastics and Composites
   Division 7 Thermal and Moisture Protection
   Division 8 Openings
   Division 9 Finishes
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   Division 21 Fire Suppression
   Division 22 Plumbing
   Division 23 Heating Ventilating, and Air Conditioning
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7. Appendices:
   7.1 Drawings
      A-01 Site Plan and Statistics
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      A-04 Interior and Millwork Elevations
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   7.2 CCDC2 Stipulated Price Contract 2008 - This is not attached but forms part of the Contract
   7.3 Certificate of Insurance
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   7.10 Submission Label
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1. **DEFINITIONS**

(a) "Agency" means The Regional Municipality of Peel, Peel Housing Corporation and any other government or agency or board on behalf of which The Regional Municipality of Peel is acting and for the purposes of the performance of the Contract shall mean the municipality or entity awarding the Contract. For purposes of the Contract, "Agency" shall include "Owner".

(b) "Document" means the document describing the goods and/or services to be purchased and the terms upon which the goods and/or services are to be purchased and includes, without limitation, those documents referenced on the index of the Document and such addenda as may be issued by the Agency from time to time.

(c) "Vendor" means the entity submitting a Vendor Submission to the Document and includes the terms "Bidder" and "Contractor".

(d) "Vendor Submission" means the document as completed by the Vendor for the purpose of offering to sell to the Agency the services and/or goods specified in the Document, and includes but is not limited to quotations, tenders, and proposals.

(e) "Operator" means the Owner's operations and maintenance employees, and/or contract operator of the site where the Work is being performed.

2. **INFORMATION AND COMMUNICATIONS**

2.1 Any information regarding this Document must be addressed in writing to the attention of **Glayton Campbell**, **Purchasing Analyst**, at fax number (905) 791-3697 or via e-mail at purchasing@peelregion.ca, and received at least four working days prior to closing. No oral communications will be considered binding. Please ensure you include the document number in all correspondence.

2.2 Any Vendor who requests and/or receives any information, with regards to this Document, by any person(s) other than the above stated or its designate, may be disqualified from further consideration.

3. **VENDOR SUBMISSIONS**

This Document is being made available to vendors electronically through the Region of Peel's website at peelpurchasing.ca. However, all Vendor Submissions must be submitted in hard copy form to the Purchasing Division, 10 Peel Centre Drive, Suite A, First Floor, Room 101, Brampton, Ontario, L6T 4B9, on or before the closing date and closing time indicated in the Document. Vendors are to print the Document in the form as provided on the Region of Peel's website, complete the required information, and submit all required documents in hard copy form.

Vendors shall not make any changes or alterations to the Document as issued by the Agency on the Region of Peel's website. The Vendor Submission of any vendor found prior to award to have made such alterations shall be disqualified by the Region and shall be given no further consideration.

In the event that following an award an alteration is discovered to have been made by the successful vendor, the Document as issued by the Agency and made available on the Agency's website shall be deemed to contain the governing terms and conditions between the parties, and any alterations made to it by the vendor shall be of no force or effect. The Agency shall further have the right, at its sole option, to terminate any Contract with a vendor who, subsequent to award, is found by the Agency to have altered the Agency's Document. This right is in addition to and without prejudice to all other rights, remedies, actions or alternatives that may be available to the Agency.

For the purposes of interpretation, all capitalized terms used herein shall have the same meanings ascribed thereto in the Document.

4. **MANDATORY SITE VISIT**

A mandatory site visit is in order to ascertain the Work requirements. Failure to sign in prior to the site visit and be present when the Purchasing representative determines that the sign-in process has closed will result in the disqualification of your Vendor Submission. Additional site visits will not be permitted. It is the responsibility of the vendor to notify and ensure that any and all subcontractors, if required, are present.

The mandatory site visit will be held at Westwood Square at 7205 Goreway Drive, Suite B7 and B8b (basement) and is scheduled for Thursday, January 9, 2014 at 1:00 p.m.

5. **DATE AND PLACE FOR RECEIVING VENDOR SUBMISSIONS AND ACCEPTANCE PERIOD**

5.1 Vendor Submissions will be received only by the Purchasing Division, 10 Peel Centre Drive, Suite A, First Floor, Room 101, Brampton, Ontario, L6T 4B9, and must be received **on or before 12:00 noon local time on Wednesday, January 22, 2014**.

Vendor Submissions shall be irrevocable and open for acceptance for a period of 90 days following the date of the Vendor Submission closing.

5.2 Appendix 7.10 is the Submission Label for your submission in accordance with the document.

5.3 Only documents found on the Region of Peel's website are to be considered "official" documents. The Region of Peel accepts no responsibility for the accuracy or completeness of information found on other websites. The onus is on the Vendor to check the Region of Peel's website to verify they have received all relevant information. The Vendor risks submitting a non-compliant bid if addenda or other required information is missing, and disqualification could result.

5.4 It is the Vendor's sole responsibility to ensure their submission is received by the time and date specified within the document.

6. **ADDENDA**

Addenda, if required, issued by Purchasing and related to this Contract shall hereby form part of the Contract. Acknowledgement of addenda on the Form of Tender shall indicate that the vendor has received the addenda in its entirety, has read and understood its content, and all addenda were considered when the bid was prepared. **Submissions which do not provide evidence of receipt of addenda as requested in each document may be rejected by the Agency as non-compliant.**

Any addenda related to this contract will be posted on the Region of Peel website at peelpurchasing.ca. Although the Region of Peel will attempt to e-mail registered Vendors notification of when addenda are posted on the website, the Region of Peel does not guarantee that e-mails will be sent or received by Vendors. **It is the Vendor's sole responsibility to check the website often to inform themselves of any posted addenda.**

7. **QUANTITIES**

Quantities in the tender are approximate only and are based on information available to the Agency at the time of tendering. Final quantities for payment of tender items supplied on a unit price basis shall be based on actual field measurements as determined by the Agency.

8. **DOCUMENT SUBMISSION DEPOSIT**

In order to be considered, Vendor Submissions shall be accompanied by a document submission deposit in the form of a certified cheque or bank draft payable to the Regional Municipality of Peel. **The amount of the document submission deposit to accompany your submission is $50,000.** Interest shall not be paid on the document submission deposit. A bid bond will not be accepted in lieu of a certified cheque or bank draft.

The document submission deposit of the two lowest Vendors will be retained after opening of the Vendor Submissions. These two document submission deposits will be returned within 45 days of the award of the Contract, unless otherwise specified within this Document.

The document submission deposit of the Vendor whose submission is accepted shall be forfeited by the Vendor should the Vendor fail to execute the contract or provide the necessary documents as required within this Document (including, without limitation, satisfactory bonds, insurance certificate, Workplace Safety and Insurance Board letter of clearance) within seven days after receiving written notice from the Agency of the award of the Contract to the Vendor.

9. **AGREEMENT AND AGREEMENT TO BOND**

Following award, the successful vendor shall be required to execute an agreement with the Agency on the terms of the CCDC2 Stipulated Price Contract 2008, as amended by the Agency's Supplementary Conditions as contained herein.

In order to be considered for award, the vendor shall submit as part of their Vendor Submission, an Agreement to Bond in the form attached in the Appendices, completed by a Bonding Company with an A.M. Best rating of B+ or better. Any others will not be accepted. Each vendor must submit the completed Agreement to Bond with its tender in order to validate their bid.

Upon receipt of written notice from the Agency that it has been awarded the Contract, the successful Vendor shall provide, within seven days of such notice, a Performance Bond and a Labour and Material Payment Bond, each for the amount of 50 per cent of the total lump sum price, to guarantee the performance of all obligations of the Contract.

10. **SUBCONTRACTORS**

The Vendor shall provide in the Form of Tender the name and address of each of its proposed Subcontractors to be utilized in this project.

Attention is drawn to Section GC 3.7 of the General Conditions, Section SC19 of the Supplementary Conditions and to the instructions on the List of Suppliers and Subcontractors in the Form of Tender.

The Contractor shall arrange that each of the Contractor's Owner-approved Subcontractors whose subcontracts have a value of $500,000 or greater, together with surety companies approved by the Owner, shall furnish to the Contractor a Performance Bond and a separate Labour and Material Payment Bond each in the amount of 50 per cent of the total value of the respective subcontract. The Performance Bond is to be in the form of C.C.A. Document (S)21 and the Labour and Material Payment Bond is to be in the form of C.C.A. Document (S)22, both as approved by the Insurance Bureau of Canada. The Owner will not reimburse the Contractor separately for the cost of the bonds, therefore the Subcontractor should allow for the cost in the Subcontractor's lump sum price.

The Owner will not require completed Agreement to Bond forms for the Subcontractors' bonds mentioned above to be submitted by the Vendor at the time of Tendering. The Vendor may decide, at the Vendor's discretion, to obtain Agreements to Bond from the Vendor's Subcontractors at the time of Tendering.

11. **VENDOR SUBMISSION**

(a) The Vendor Submission must be made on the printed forms supplied by the Agency for that purpose and must be clearly legible with all blanks filled in, using ink or type. Scanning is not permitted.

(b) The Vendor Submission must be signed by a person or persons authorized to sign on behalf of the Vendor and the same person or persons shall initial any erasures, overwriting or strikeouts within the Vendor Submission.

(c) All pricing in the Vendor Submission must be expressed in figures, and must be in Canadian Dollars.

(d) Prices in the Vendor Submission must include all costs necessary to complete the Work in accordance with the Document including customs and duties.

(e) No oral or written alterations or variations in the terms and conditions of the Document and/or Contract shall be valid or binding upon the Agency unless authorized by the Agency in writing.

(f) Vendor Submissions which are qualified or subject to any conditions, limitations or restrictions shall be rejected by the Agency.

(g) The Vendor acknowledges that it is solely responsible for obtaining and reviewing all the Contract documents and all addenda issued by the Agency pertaining to the Document.

12. **AGENCY RIGHTS**

The Agency reserves the right, in its sole and absolute discretion to:

(a) deem a Vendor Submission to be unbalanced and may reject any and all Vendor Submissions, which it so deems, and for this purpose, "unbalanced" shall include, without limitation, a Vendor Submission which does not reflect a realistic breakdown of the costs of each or any portion of the Work;

(b) adjust the totals in a Vendor Submission where there are errors in extensions, additions or computations. In such cases, the unit prices shown shall govern;

(c) reject any or all Vendor Submissions, accept a Vendor Submission which is not the lowest price, reject a Vendor Submission even if it is the only one received by the Agency; and cancel this request for Vendor Submissions at any time either before or after the receipt of Vendor Submissions, following which the Agency may proceed as it determines in its sole discretion, including without limitation, negotiating with any one or more of the vendors or any other person or entity for the performance of the Work under such terms and conditions as the Agency may decide in its sole discretion, or issuing a new request for Vendor Submissions on the same or modified terms, all without liability to itself;

(d) inspect and have a demonstration of the goods and/or services offered prior to award of a Contract and request evidence of experience, ability or financial standing;

(e) waive formalities, technical defects, irregularities and omissions in a Vendor Submission and may accept a Vendor Submission, which does not comply with the formal requirements of the Document, if in doing so the best interests of the Agency will be served;

(f) remove from the Agency's list of Vendors, the name of any Vendor for failure to accept a contract or for unsatisfactory performance or non-performance of a contract; and

(g) fully evaluate the Vendor Submission, which evaluation may include, without limitation, a review of references, past performance history, completion history (including extended completion dates), litigation history (including construction liens filed by subcontractors for non-payment) and claims history of the Vendor, and to reject a Vendor Submission if same is not satisfactory to the Agency.

(h) seek further information and/or clarification, including without limitation a detailed price breakdown, from any vendor after the closing time, for the purposes of assisting the Agency in interpreting and evaluating any Vendor Submission and in interpreting any inconsistencies which may appear in any Vendor Submission, and the Agency shall have the right to consider and rely on such further information and clarifications in evaluating the Vendor Submissions and awarding the Contract.

13. **CONFIDENTIAL INFORMATION/OWNERSHIP AND DISCLOSURE OF VENDOR SUBMISSIONS**

(a) The vendor agrees to protect and maintain the confidentiality of all personal or other information, including all personal health information, that the vendor accesses or of which the vendor acquires knowledge of as a result of the services in this Contract, and agrees to use, collect, disclose, retain, protect and dispose of the personal (health) information only in accordance with all privacy legislation applicable to the Agency where it is acting on behalf of the Agency. Disclosure of any information shall be done only with the Agency's prior written consent. The provisions of the indemnity clause in this Contract apply to any breach of privacy or confidentiality in this clause. The vendor shall ensure that its directors, officers, employees, agents, subcontractors and anyone else for whom it is responsible in law all adhere to the requirements of this section regarding privacy and confidentiality.

(b) The Agency, and the Agency's responsibilities under this Contract, are subject to all applicable privacy legislation including the *Municipal Freedom of Information and Protection of Privacy Act*, R.S.O. 1990 c.M.56, as amended ("MFIPPA") and/or the *Personal Health Information Protection Act*, 2004 ("PHIPA") with respect to the collection, use, disclosure, retention and protection of confidential, sensitive or personal (health) information under the Agency's custody and control. Under an MFIPPA request, all documents provided to the Agency by the vendor pursuant to the procurement process which led to this Contract, and the Contract itself and associated documents, may be required by law to be made available to a requesting member of the public, with the possible exception that the party submitting certain information requests that it be treated as confidential and that there is an appropriate exemption to disclosure in MFIPPA, or a non-disclosure requirement in either MFIPPA or PHIPA.

(c) The Vendor Submissions, along with all correspondence, documentation and information provided to the Agency by any vendor in connection with or arising out of the Vendor Submission, once received by the Agency, shall become the property of the Agency and may be appended to any agreement and/or purchase order with the successful vendor. Vendors must identify in their Vendor Submissions any scientific, technical, proprietary, commercial or other confidential information, the disclosure of which could cause them injury.

(d) In purchases where a public opening of Vendor Submissions will be taking place, the name of each vendor and the lump sum price contained in their Vendor Submission shall be read out by the Agency at the public opening.

(e) Where award is to be made by Regional Council, the Peel Police Services Board or the Board of Directors of Peel Housing Corporation, information regarding all Vendor Submissions, including names of each vendor, lump sum prices and the annual or overall value of the Contract and/or Vendor Submissions shall be included in public reports to Regional Council or the relevant Boards such that the information is released publicly. The vendor acknowledges that the Agency cannot guarantee it can honour requests to keep vendor information confidential in light of applicable law requirements, and also in light of the need for transparency and public disclosure where release of vendor information in public Council reports related to a specific project or procurement process is necessary.

14. **COLLUSION AND CONFLICT OF INTEREST**

(a) Should the Vendor give or offer any gratuity to or attempt to bribe any member of the Agency, or to commit collusion or fraud, the Agency shall be at liberty to reject the Vendor Submission or, if a Contract has been awarded, terminate the Contract forthwith, without liability to itself, and to rely upon the sureties as provided for.

(b) The Vendor represents and declares that:

(i) no member, officer or employee of the Agency or Council has or will have an interest, directly or indirectly, in the performance of the Contract, or in the supplies, Work or business in connection with the said Contract, or in any portion of the profits thereof, or in any monies to be derived therefrom;

(ii) the Vendor Submission is not made in collusion with any other Vendor making a Vendor Submission for the same goods and services and is, in all respects, fair and without fraud.

15. **HARMONIZED SALES TAX (H.S.T.) INFORMATION**

The Agency is subject to the payment of provincial and federal taxes imposed by the Provincial and Federal Governments and, if required, the collection of any withholding tax for non-resident Vendors. All prices within this document shall be quoted exclusive of HST.

16. **ACCESSIBILITY FOR ONTARIANS WITH DISABILITIES**

The successful vendor shall comply with the provisions of *Accessibility for Ontarians with Disabilities Act*, 2005, and the Regulations thereunder with regard to the provision of its goods or services to persons with disabilities. The successful vendor acknowledges that pursuant to the *Accessibility for Ontarians with Disabilities Act*, 2005, the Region of Peel must, in deciding to purchase goods or services through its procurement process, consider the accessibility for persons with disabilities to such goods or services. This legislation can be accessed through the following link to the Government of Ontario's website:
http://www.e-law.gov.on.ca/html/statutues/english/elaw_statutes_05a11_e.htm. You may also access this link at peelpurchasing.ca and also view the Accessibility Standards for Customer Service.

Upon award of this contract, the successful vendor will be required to sign and return the acknowledgement of Accessibility Regulations for Contracted Services (refer to Appendix 7.8).

17. **INVOICING AND PAYMENT INSTRUCTIONS**

17.1 **All invoices must be sent to the individual ordering the goods/services or as directed at the time of the order placement.**
Failure to do so will result in a delay of payment.

17.2 The Agency's method of payment is by Electronic Funds Transfer (EFT). The successful Vendor will be required to provide the Agency, with the Application for Vendor Direct Deposit form containing original signatures in ink, by return mail or hand delivered, the following banking information:

17.2.1 Names of two Company Officers, their titles, e-mail addresses, fax numbers, and phone numbers. Note: Both Company Officers must sign off on any subsequent changes to the successful Vendor's banking information.

17.2.2 Company mailing and remittance addresses.

17.2.3 Banking information including a void cheque.

17.2.4 The successful Vendor is required to notify the Agency of any changes to this information immediately.

18. **CONTRACT AWARD**

Award of the Contract is subject to the receipt of all necessary approvals among which is the approval of the Chief Financial Officer. Without limiting any rights otherwise available to the Agency in the Document or at law to cancel the tender or to decline to award the tender to any vendor, the Agency specifically reserves the right, in its sole and absolute discretion, to cancel this tender should either of the above approvals not be granted or in the event that the necessary property is not acquired.

Without limiting all other rights that may be exercised by the Agency pursuant to this Document, vendors are advised that the Agency reserves the right to fully evaluate Vendor Submissions, which evaluation may include, without limitation, a review of references, past performance history, completion history (including extended completion dates), litigation history (including construction liens filed by subcontractors for non payment) and claims history of the vendors, and to reject a Vendor Submission if same is not satisfactory to the Agency.

SCHEDULE 1

Supplementary Conditions for Standard Construction Document CCDC2 2008 Stipulated Price Contract

SC 1. GENERAL

These Supplementary Conditions presuppose the use of the Standard Construction Document CCDC2 – 2008 Stipulated Price Contract. These "Supplementary Conditions" void, supersede or amend the "Agreement", "Definitions" and "General Conditions" as hereinafter provided, as the case may be.

SC 2. AGREEMENT

1. Amend Article A-1 THE WORK as follows:

   i) Add the following word to the beginning of paragraph 1.1, "diligently",

   ii) Add the following as new paragraph 1.4:

   > "1.4 provide all the labour, materials, equipment, machinery, *Products* and work including, without limitation, all commissioning services required by the *Contract Documents* in order to fully complete and construct the *Work* and in accordance with, and satisfaction of, all applicable federal, provincial, municipal and local laws, regulations, rules, by-laws, guidelines, standards, permits, statutes, ordinances, and codes including, without limitation, those relating to occupational health and safety and any and all obligations, responsibilities and duties required by or set out in any site plan agreement or approval, attributable to the *Place of the Work* and/or the proposed development therein, and furnish efficient business and construction administration and superintendence consistent with the interests of the *Owner*."

2. Add the following documents to the existing list of *Contract Documents* set out in Article A-3 CONTRACT DOCUMENTS:

   - Addenda, as issued
   - Instructions to Vendors
   - Supplementary General Conditions to CCDC2-2008
   - Form of Tender
   - Agreement to Bond
   - Specifications

Division 1	General Requirements
Division 2	Existing Conditions
Division 6	Wood, Plastics and Composites
Division 7	Thermal and Moisture Protection
Division 8	Openings
Division 9	Finishes
Division 10	Specialties
Division 21	Fire Suppression
Division 22	Plumbing
Division 23	Heating Ventilating, and Air Conditioning
Division 26	Electrical
Division 27	Communications

   - Drawings:

A-01	Site Plan and Statistics
A-02	Floor and Ceiling Plan
A-03	Washroom Plan and Elevations

A-04 Interior and Millwork Elevations
A-05 Millwork Plan and Sections
E-1 Power Layout
E-2 Lighting Layout
E-3 Electrical Distribution and Details
M-1 H.V.A.C. and Sprinkler Layout
M-2 Plumbing Layout
M-3 Details

- CCDC2 Stipulated Price Contract 2008 - This is not attached but forms part of the Contract
- Certificate of Insurance
- Form of Performance Bond
- Form of Labour and Material Payment Bond
- Certificate of Compliance with Health & Safety Regulations
- Code of Conduct
- Designated Substances Survey

3. Delete ARTICLE A-5 PAYMENT in its entirety and replace with the following:

(a) "ARTICLE A-5 PAYMENT

5.1 Subject to, and in accordance with, the provisions of the *Contract Documents* and the *Construction Lien Act* (Ontario) the *Owner* shall:

.1 make monthly progress payments to the *Contractor* on account of the *Contract Price* when due in the amount certified by the *Consultant* together with such *Value Added Taxes* as may be applicable to such amount certified by the *Consultant*;

.2 upon *Substantial Performance of the Work*, pay the *Contractor* the unpaid balance of the holdback amount when due together with such *Value Added Taxes* as may be applicable to such payment; and

.3 upon the issuance of the final certificate for payment, pay to the *Contractor* the unpaid balance of the *Contract Price* when due together with such *Value Added Taxes* as may be applicable to such payment.

5.2 As such payments become due, the *Contractor* shall, in accordance with the terms of its agreements with any *Subcontractors*, *Suppliers* and workmen, pay all of its *Subcontractors*, *Suppliers* and workmen in full on account of work properly performed or *Products* properly supplied, as applicable, less any holdback monies retained in compliance with the *Construction Lien Act* (Ontario).

5.3 In the event of loss or damage occurring where payment becomes due under the property and boiler and machinery insurance policies, payments shall be made to the *Contractor* in accordance with the provisions of GC 11.1 - INSURANCE of the General Conditions.

5.4 Interest

.1 Should either party fail to make payments as they become due under the terms of the *Contract* or in an award by arbitration or court, interest at one per cent per annum above the bank rate on such unpaid amounts shall also become due and payable until payment. Such interest shall be compounded on a monthly basis. The bank rate shall be the rate

established by the Bank of Canada as the minimum rate at which the Bank of Canada makes short term advances to the chartered banks.

.2 Interest shall apply at the rate and in the manner prescribed by Section 5.4.1 of this Agreement on the amount of any claim advanced and for which the *Contractor* is thereafter entitled to payment, either pursuant to Part 8 - Dispute Resolution of the General Conditions, or otherwise, from the date the amount would have been due and payable under the *Contract*, had it not been in dispute, until the date it is paid."

SC 3. RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING

1. Amend paragraph 6.1 by deleting the words "or other form of electronic communication during the transmission of which no indication of failure of receipt is communicated to the sender.", and by deleting the words "or other form of electronic communication".

SC 4. LANGUAGE OF THE CONTRACT

1.1 Amend paragraph 7.1 to read:

"When the Contract Documents are prepared in both English and French languages, it is agreed that in the event of any apparent discrepancy between the English and French versions, the English language shall prevail."

SC 5. SUBCONTRACTORS

1. Add new ARTICLE A-9 – ASSIGNMENT OF SUBCONTRACTS, as follows:

(a) "ARTICLE A-9 ASSIGNMENT OF SUBCONTRACTS

9.1 The *Owner* shall not be deemed by virtue of the *Contract* or for any other reason to have any contractual relationship with or obligation to any *Subcontractor* or *Supplier* but the *Contractor* hereby agrees that in the event that:

.1 the *Contract* is terminated; or

.2 the *Contractor*'s right to continue the *Work* is terminated;

and at the sole and absolute option of the *Owner*, any or all subcontracts for *Work* or *Products* as may be selected by the *Owner*, in its sole and absolute discretion, shall, upon notice to the *Contractor* and the affected *Subcontractors* and *Suppliers* from the *Owner*, be assigned to the *Owner*, without any further action being necessary from the *Contractor* or the affected *Subcontractors* and *Suppliers* and in order to ensure the *Owner*'s rights, the *Contractor* shall:

.3 contractually obligate each of its *Subcontractors* and *Suppliers* to agree that each such subcontract shall be assignable, at the *Owner*'s option, to the *Owner*, upon delivery of the notice described above, in the event that:

(A) the *Contract* is terminated; or

(B) the *Contractor*'s right to continue the *Work* is terminated.

9.2 The *Contractor* shall provide satisfactory evidence to the *Owner* that this obligation has been fulfilled."

SC 6. DEFINITIONS

1. Amend definition "1. Change Directive" by deleting the words "within the general scope of the *Contract Documents*".

2. Amend definition "4. Consultant" by adding the following sentence after the last sentence:

"The words "Engineer", "Architect" or "*Consultant*" wherever used in the *Contract Documents* shall be regarded as synonymous."

3. Amend definition "8. Contract Time" as follows:

(a) delete "*Substantial Performance of the Work*" and replace with "the *Substantial Performance Date"*

4. Amend definition "9. Contractor" by adding the following sentence after the second sentence:

"For the purpose of the *Contract*, the words "*Contractor*" or "*General Contractor*" shall be regarded as synonymous."

5. Amend definition "10. Drawings" as follows:

(a) add "and approved, in writing, by the Owner" after the word "issued," in the second line.

6. Amend definition "13. *Place of the Work*" by adding the following sentence:

"The term "*Place of the Work*" and "*Site*" wherever used in the *Contract Documents* shall be regarded as synonymous."

7. Amend definition "16. Provide" by adding the following after "install":

"or supply, install and connect as applicable, complete and in place, including accessories, finishes, tests, and services required to render each item so specified complete and ready for use."

8. Amend definition "17. Shop Drawings" as follows:

(a) delete "which the *Contractor* provides" and replace it with "to be provided by the *Contractor*".

9. Amend definition "18. Specifications" as follows:

add "and approved, in writing, by the Owner" after "issued," in the first line.

10. Amend definition "25. *Work*" by adding ", *Products*, installation, commissioning, checkout, start-up, testing" after "total construction".

11. Delete definition "26. Working Day" in its entirety and replace with the following:

"26. Working Day"

"Working Day" means a day when the Regional Municipality of Peel is open, Monday to Friday, and does not include weekends or statutory holidays."

12. Add the following new definitions:

"27. Contract Completion"

Contract Completion means when the entire *Work* except those items arising from the provisions of GC 12.3 – Warranty has been performed to the requirements of the *Contract Documents* and is so certified by the *Consultant*.

28. Authorities Having Jurisdiction

The phrase *Authorities Having Jurisdiction* or the term *Authorities* means those authorities having jurisdiction under law over the *Work* or parts thereof.

29. Contract Schedule

Contract Schedule means the schedule indicating the timing of major activities of the *Work* submitted by the *Contractor* and approved in writing by the *Owner* including attaining *Substantial Performance of the Work* by the *Substantial Performance Date.*

30. Supply or Furnish

Supply or *Furnish* means fabrication or procurement of materials, equipment, or components, or performance of services to the extent specified and shown. Where used with respect to materials, equipment, or components, the term includes crating and delivery to the *Place of the Work* but is not intended to include installation of items, either temporary or final.

31. Install

Install means the placement of materials, equipment, or components, including receiving, unloading, transporting, storage, uncrating and installing, and performance of such testing and finish work as is compatible with the degree of installation specified.

32. Commission

Commission means, and *Commissioning* refers to, the procedure which includes checking, testing, adjusting and measuring *Work* performed by the *Contractor* to demonstrate and verify the installation, operation and performance of all components and the entire system.

33. Other Contractor

Other Contractor means an individual, firm, partnership or corporation having a separate contract with the *Owner* for work other than that required by the *Contract Documents*.

34. Substantial Performance Date

Substantial Performance Date means the date by which the *Contractor* shall attain *Substantial Performance of the Work* as specified in Article A-1 – THE WORK."

35. Reports

Reports means the Reports set out in Article A-3 – CONTRACT DOCUMENTS.

36. Rules of Mediation and Arbitration

Rules of Mediation and Arbitration mean the rules as provided in CCDC 40 in effect at the time of bid close.

SC 7. – GC 1.1 CONTRACT DOCUMENTS

1. Delete the first sentence in paragraph 1.1.1 and replace it with the following:

   (a) "The intent of the *Contract Documents* is to include the construction, labour, *Products*, Construction Equipment and other services necessary, complementary or ancillary, for the performance and completion of the *Work* by the *Contractor* in accordance with the *Contract Documents* or properly inferable from them."

2. Amend paragraph 1.1.6 by adding the following at the end of the provision:

   "or in establishing the extent of the work to be performed by a trade."

3. Amend paragraph 1.1.7.1 by adding after "from highest to lowest, shall be:":

   - Addenda, as issued
   - Instructions to Vendors
   - Supplementary General Conditions to CCDC2-2008
   - Form of Tender
   - Agreement to Bond
   - Specifications
     Division 1 General Requirements
     Division 2 Existing Conditions
     Division 6 Wood, Plastics and Composites
     Division 7 Thermal and Moisture Protection
     Division 8 Openings
     Division 9 Finishes
     Division 10 Specialties
     Division 21 Fire Suppression
     Division 22 Plumbing
     Division 23 Heating Ventilating, and Air Conditioning
     Division 26 Electrical
   - Division 27 Communications Drawings:
     A-01 Site Plan and Statistics
     A-02 Floor and Ceiling Plan
     A-03 Washroom Plan and Elevations
     A-04 Interior and Millwork Elevations
     A-05 Millwork Plan and Sections
     E-1 Power Layout
     E-2 Lighting Layout
     E-3 Electrical Distribution and Details
     M-1 H.V.A.C. and Sprinkler Layout
     M-2 Plumbing Layout
     M-3 Details
   - CCDC2 Stipulated Price Contract 2008 - This is not attached but forms part of the Contract
   - Certificate of Insurance
   - Form of Performance Bond
   - Form of Labour and Material Payment Bond
   - Certificate of Compliance with Health & Safety Regulations
   - Code of Conduct
   - Designated Substances Survey

4. In the first sentence of paragraph 1.1.9 delete "and shall remain the *Consultant's* property" and replace with "not the *Contractor's* property"

5. Add new paragraph 1.1.11 and paragraph 1.1.12, as follows:

(a) "1.1.11 The *Contractor* shall review the *Contract Documents* and shall report promptly to the *Owner* and the *Consultant* any error, inconsistency, or omission the *Contractor* may discover. If the *Contractor* does discover any error, inconsistency, or omission in the *Contract Documents*, the *Contractor* shall not proceed with the *Work* affected until the error, inconsistency or omission has been addressed and in dealing with such error, inconsistency or omission the *Contractor* shall co-operate with the *Owner* in good faith to resolve such errors, inconsistency or omission so as to avoid any increase in the *Contract Price* or delay in the progress of the *Work*.

1.1.12 The *Contractor* declares and represents that in entering into the *Contract* with the *Owner* for the performance of the *Work*, it has reviewed any and all documentation including, without limitation, the Reports provided by the *Owner* and has either visually investigated for itself the character of the *Work* to be done and all local conditions including, without limitation, the position of all pole lines, conduits, watermains, sewers and other underground and overground utilities and structures, or that, not having so reviewed or visually investigated, the *Contractor* has assumed and does hereby assume all risk of conditions now existing or arising in the course of the *Work* which could have been reasonably identified by a visual inspection or which are identified or inferred in any information provided by the *Owner* including, without limitation, the Reports, which might or could make the *Work*, or any items thereof more expensive in character, or more onerous to fulfill, than was contemplated or known when the *Contract* was signed."

SC 8. – GC 1.4 ASSIGNMENT

1. Delete paragraph 1.4.1 in its entirety and replace it with the following:

(a) "The *Contractor* shall not assign the *Contract*, or any portion thereof, without the prior written consent of the *Owner*, which consent may not be unreasonably withheld. The *Owner* shall be entitled to assign the *Contract* to any person, corporation, or other entity (the "Assignee"). Upon the assumption by the Assignee of the *Owner*'s obligations under the *Contract*, the *Owner* shall be released from its obligations arising under the *Contract*."

SC 9. TIME IS OF THE ESSENCE OF THE CONTRACT

1. Add new GC 1.5 TIME as follows:

"1.5.1 All time limits stated in the *Contract Documents* are of the essence of the *Contract*."

SC 10. CONFIDENTIALITY AND CO-OPERATION, CONSULTATION AND CO-ORDINATION

1. Add new GC 1.6 CONFIDENTIAL INFORMATION/OWNERSHIP AND DISCLOSURE OF CONTRACTOR SUBMISSIONS as follows:

1.6.1 The *Contractor* agrees to protect and maintain the confidentiality of all personal or other information, including all personal health information, that the *Contractor* accesses or of which the *Contractor* acquires knowledge of as a result of the services in this Contract,

and agrees to use, collect, disclose, retain, protect and dispose of the personal (health) information only in accordance with all privacy legislation applicable to the *Owner* where it is acting on behalf of the *Owner*. Disclosure of any information shall be done only with the *Owner*'s prior written consent. The provisions of the indemnity clause in this Contract apply to any breach of privacy or confidentiality in this clause. The *Contractor* shall ensure that its directors, officers, employees, agents, subcontractors and anyone else for whom it is responsible in law all adhere to the requirements of this section regarding privacy and confidentiality.

1.6.2 The *Owner*, and the *Owner*'s responsibilities under this Contract, are subject to all applicable privacy legislation including the *Municipal Freedom of Information and Protection of Privacy Act*, R.S.O. 1990 c.M.56, as amended ("MFIPPA") and/or the *Personal Health Information Protection Act*, 2004 ("PHIPA") with respect to the collection, use, disclosure, retention and protection of confidential, sensitive or personal (health) information under the *Owner's* custody and control. Under an MFIPPA request, all documents provided to the *Owner* by the *Contractor* pursuant to the procurement process which led to this Contract, and the Contract itself and associated documents, may be required by law to be made available to a requesting member of the public, with the possible exception that the party submitting certain information requests that it be treated as confidential and that there is an appropriate exemption to disclosure in MFIPPA, or a non-disclosure requirement in either MFIPPA or PHIPA.

1.6.3 The *Contractor's* Submission, along with all correspondence, documentation and information provided to the *Owner* by any *Contractor* in connection with or arising out of the *Contractor's* Submission, once received by the *Owner*, shall become the property of the *Owner* and may be appended to any agreement and/or purchase order with the successful *Contractor*. *Contractors* must identify in their Submissions any scientific, technical, proprietary, commercial or other confidential information, the disclosure of which could cause them injury.

1.6.4 In purchases where a public opening of the *Contractor's* Submission will be taking place, the name of each *Contractor* and the lump sum price contained in their Submission shall be read out by the *Owner* at the public opening.

1.6.5 Where award is to be made by Regional Council, the Peel Police Services Board or the Board of Directors of Peel Housing Corporation, information regarding all *Contractor's* Submissions, including names of each *Contractor*, lump sum prices and the annual or overall value of the Contract and/or the *Contractor's* Submissions shall be included in public reports to Regional Council or the relevant Boards such that the information is released publicly. The *Contractor* acknowledges that the *Owner* cannot guarantee it can honour requests to keep *Contractor* information confidential in light of applicable law requirements, and also in light of the need for transparency and public disclosure where release of the *Contractor*'s information in public Council reports related to a specific project or procurement process is necessary.

2. Add new GC 1.7 CO-OPERATION, CONSULTATION AND CO-ORDINATION as follows:

"1.7.1 The *Contractor* shall, at all times and as part of the *Work*, fully assist, co-operate, consult and co-ordinate with the *Consultant* and any other consultants or other entities retained or identified by the Owner which are related to the Project (collectively, the "Other Entities"). The objective of such assistance, co-operation, consultation and co-ordination is to make certain the *Work* is properly co-ordinated with and integrated with the work and services of the Other Entities.

1.7.2 Without limiting the generality of any other provision in the Contract, the *Contractor* shall attend all design, construction, general co-ordination and progress meetings relating to the *Work* between the *Consultant*, the Owner and Other Entities and any other meeting relating to the Project as requested by the Owner to discuss and resolve all matters and issues relating to the Project. The *Contractor* shall, on a timely basis, prepare and distribute detailed minutes to the Owner of the construction and progress meetings which it attends, if requested by the Owner."

SC 11. – GC 2.1 AUTHORITY OF THE CONSULTANT

1. Amend the provisions of GC 2.1 – AUTHORITY OF THE CONSULTANT as follows:

   (a) In paragraph 2.1.3 delete “against whom the *Contractor* makes no reasonable objection”.

SC 12. – GC 2.2 ROLE OF THE CONSULTANT

1. Amend the provisions of GC 2.2 ROLE OF THE CONSULTANT as follows:

   (a) Add the following sentence to paragraph 2.2.3: “The presence of such project representatives at the *Place of the Work* will not abrogate any of the *Contractor*’s responsibility to perform the *Work* as required by the *Contract Documents*.”

   (b) In paragraph 2.2.6 - insert the words “to the *Contractor*” after the words “the *Consultant* will not be responsible” in each of the first two sentences of such paragraph.

   (c) In paragraph 2.2.7 - delete the words “Except with respect to GC 5.1 - FINANCING INFORMATION REQUIRED OF THE OWNER, the” and replace with "The".

   (d) In paragraph 2.2.17 - insert the words “to the *Contractor*” after the words “the *Consultant* does not guarantee”.

SC 13. – GC 2.3 REVIEW AND INSPECTION OF THE WORK

1. Amend the provisions of GC 2.3 REVIEW AND INSPECTION OF THE WORK as follows:

   (a) In paragraph 2.3.1 delete “the *Consultant*” and replace with “*Consultant* and Owner” in the second sentence only.

   (b) Amend paragraph 2.3.2 as follows:

      (i) add “regulations, rules, by-laws, standards, guidelines, permits, statutes, codes,” before “laws or ordinances”.

   (c) Amend paragraph 2.3.6 by replacing "designated in" with "required by", by replacing "designated by" with "required by" and by adding “or required by the Consultant” after “Contract Documents”.

   (d) Amend paragraph 2.3.7 by replacing "designated in" with "required by".

SC 14. - GC 2.4 DEFECTIVE WORK

1. Amend paragraph 2.4.1 by deleting "*Consultant*" in the first instance and replacing it with "*Consultant* and/or Owner" and by adding “, at the *Contractor*’s expense,” after “*Contract Documents*,”

SC 15. – GC 3.2 CONSTRUCTION BY OWNER OR OTHER CONTRACTORS

1. Delete paragraph 3.2.2.2 in its entirety and replace with “3.2.2.2 INTENTIONALLY DELETED”.

2. Add to paragraph 3.2.2.3:

   “. Without restricting the generality of paragraph 3.6.1, the *Contractor* acknowledges that, if the *Owner* does not enter into any other contracts for the *Project*, the *Contractor* is the “constructor” and the “employer” within the meaning of the *Occupational Health and Safety Act* (Ontario)

and the *Contractor* undertakes to carry out the duties, obligations and responsibilities of the constructor and the employer with respect to the *Project*. In the event that the *Owner* enters into more than one contract for the *Project*, the *Contractor* agrees to fulfill all of the duties, obligations and responsibilities of the "constructor" and "employer" with respect to the *Project* and on behalf of the *Owner*. In the case where the *Owner* enters into more than one contract for the *Project*, the *Owner* shall contractually require the *Other Contractors* to comply with the *Contractor*'s safety program and safety instructions and the *Contractor*, in fulfilling the role of constructor, will have the right to remove the *Other Contractors* from the *Place of the Work* should they not comply with the *Contractor*'s safety program and safety instructions. Without restricting the generality of any other term or condition in the Contract, the *Contractor* shall indemnify and hold harmless the *Owner* from any liability for claims, damages or penalties, including reasonable legal fees to defend any offences, arising from the *Contractor*'s failure to comply with the duties, responsibilities and obligations of the constructor and the employer under the *Occupational Health and Safety Act* (Ontario)."

3. In paragraph 3.2.2.4, add the words "as the Owner considers appropriate" after the words "GC 11.1 –INSURANCE" in the second line.

4. Amend paragraph 3.2.3.3 by adding: "Failure by the *Contractor* to so report shall invalidate any claims against the Owner by reason of deficiencies in the work of *Other Contractors* or Owner's own forces except those deficiencies not then reasonably discoverable."

5. Add paragraph 3.2.3.4 as follows: "co-ordinate and perform the *Work* with care and diligence so as to ensure that the *Owner* and the *Other Contractors* will be in a position to proceed according to schedule with the delivery, installation and testing of the equipment and other components to be incorporated into the *Project* and allow the *Owner* and the *Other Contractors* reasonable opportunity to receive and store materials and products on site and to perform their work."

SC 16. - GC 3.4 DOCUMENT REVIEW:

1. Add new paragraph 3.4.2:

"Notwithstanding the foregoing, inconsistencies and omissions shall not include lack of reference on the *Drawings* or in the Specifications to labour and/or *Products* that are required or normally recognized within respective trade practices as being necessary for the complete execution of the *Work*."

SC 17. – GC 3.5 CONSTRUCTION SCHEDULE

1. Delete paragraph 3.5.1 and substitute the following:

"3.5.1 The *Contractor* shall:

.1 prior to commencement of construction, prepare and submit to the Owner and the *Consultant* for their review and acceptance a construction schedule indicating the critical path for the Project, using "Primavera Project Planner" or equivalent, demonstrating that the *Work* will be performed in conformity with the Contract Time, and shall conform to the phasing and sequencing requirements for the *Work* as set out in the Contract Documents or as otherwise required by the Consultant or the Owner including, without limitation, a Products delivery schedule with respect to the Products whose delivery is critical to the schedule of the *Work*. The *Contractor* shall provide the schedule information required by this paragraph 3.5.1.1 in both electronic format and hard copy. Once approved by the Owner and the *Consultant*, the construction schedule submitted by the *Contractor* under this paragraph 3.5.1.1, as updated by the *Contractor* and approved by the Owner, shall become the "Construction Schedule";

.2 monitor the progress of the *Work* on a weekly basis relative to the Construction Schedule and update the Construction Schedule on a monthly basis;

.3 perform the *Work* in accordance with the Construction Schedule;

.4 advise the *Consultant* of any revisions required to the Construction Schedule as a result of extension of the Contract Time in accordance with PART 6 – CHANGES IN THE WORK; and

.5 identify potential variances between scheduling and scheduled completion dates and implement necessary adjustments in the Construction Schedule in order to meet the Substantial Performance Date.

3.5.2 On request of the *Consultant*, the *Contractor* shall provide information regarding the progress of the *Work* or any part of it, or, copies, schedules and orders covering materials, components and services. The *Contractor* shall cooperate fully with the *Consultant*, and shall ensure that all Subcontractors and Suppliers and anyone for whom the Subcontractors and Suppliers may be responsible also cooperate and make available on request the same documents.

3.5.3 Without limiting the other obligations of the *Contractor* under GC3.5, the *Contractor* shall not amend the Construction Schedule (including, without limitation, any changes to the critical path) without the prior written approval of the Owner."

SC 18. – GC 3.6 CONTRACTOR'S PERSONNEL COMMITMENT

1. Delete GC 3.6 - SUPERVISION in its entirety and replace it with the following:

(a) **"GC 3.6 CONTRACTOR'S PERSONNEL COMMITMENT**

3.6.1 The *Contractor* shall furnish a competent and adequate staff, who shall be in attendance at the *Place of the Work* at all times, as necessary, for the proper administration, co-ordination, supervision and superintendence of the *Work*; organize the procurement of all materials and equipment so that they will be available at the time they are needed for the *Work*; and keep an adequate force of skilled workmen on the job to complete the *Work* in accordance with all requirements of the *Contract Documents*.

3.6.2 Prior to commencement of the *Work*, the *Contractor* shall select a competent and experienced full time project manager (the "Project Manager") who shall be in attendance at the *Place of the Work* or on the road and engaged in the *Work* at all times, and a competent and experienced full time site supervisor (the "Site Supervisor") who shall be in attendance at the *Place of the Work* at all times. Both the Project Manager and Site Supervisor shall be Gold Seal Certified or equivalent. The Project Manager shall have full responsibility for the prosecution of the *Work*, with full authority to act in all matters as may be necessary for the proper co-ordination, supervision, direction and technical administration of the *Work*, who shall attend site meetings in order to render reports on the progress of the *Work* and who shall have authority to bind the *Contractor* in all matters related to this Contract. The Project Manager and the Site Supervisor shall be satisfactory to the *Owner* and shall not be changed except for good reason and with the prior written approval of the *Owner*.

3.6.3 The Project Manager and Site Supervisor shall represent the *Contractor* at the *Place of the Work* and notices and instructions given to the Project Manager and/or the Site Supervisor shall be held to have been received by the *Contractor*.

3.6.4 The *Contractor* may not change its Project Manager or its Site Supervisor without the *Owner*'s prior written approval which shall not be unreasonably withheld.

Further, the *Contractor* shall not employ or continue to employ on the *Work* anyone to whom the *Owner* may reasonably object.

3.6.5. The *Contractor* shall provide the *Owner* and the *Consultant* with the names, addresses and telephone numbers of the Project Manager, the Site Supervisor and other responsible field persons who may be contacted for emergency and other reasons during non-working hours."

SC 19. – GC 3.7 SUBCONTRACTORS AND SUPPLIERS

1. Amend paragraph 3.7.4 by adding "or anyone else performing the Work" after "Supplier".

2. Add new paragraph 3.7.7 as follows:

(a) "3.7.7 The *Contractor* shall not change any of the *Subcontractors* or *Suppliers* proposed by him in writing and accepted by the *Owner* at the signing of the *Contract* without the *Owner*'s prior written consent or execute any subcontracts for the performance of the *Work* without the *Owner*'s prior written consent."

SC 20. – GC 3.8 LABOUR AND PRODUCTS

1. Amend paragraph 3.8.2 as follows:

(a) add "and free from defects" after "new"; and

(b) delete the second sentence of paragraph 3.8.2 and replace it with the following:

"All *Products* and workmanship shall be in every respect of the best quality and the *Work* shall be performed in accordance with the best modern practice. Whenever the *Contract Documents*, or directions of the *Consultant*, admit of a reasonable doubt about what is permissible, and when they fail to state the quality of any *Work*, the interpretation that requires the quality be consistent with the quality of similar Products specified is to be followed."

2. Delete paragraph 3.8.3 and replace it with:

"3.8.3 The *Contractor* shall:

.1 maintain good order and discipline among all personnel engaged on the *Work*;

.2 not employ any persons on the Project whose labour affiliation (or lack thereof) is incompatible with other labour employed in connection with this Project or at the *Place of the Work*; and

.3 act promptly on all problems of labour relations including grievances and jurisdictional disputes. The *Contractor* shall not employ on the *Work* anyone not skilled in the task assigned to him and the Owner has the right to require the *Contractor* to remove from the workforce for the *Work* any employee, representative or other personnel deemed by the Owner, acting reasonably, to be incompetent, careless or otherwise objectionable, or whose actions are contrary to public interest or inconsistent with the best interest of the Owner."

3. Add new paragraph 3.8.4:

"The cost for overtime required beyond the normal working day to complete individual construction operations of a continuous nature, such as pouring or finishing of concrete or

similar work, or work that the *Contractor* elects to perform at overtime rates without the *Owner* or the *Consultant* requesting it shall not be chargeable to the *Owner* and shall be at the sole cost and expense of the *Contractor*."

4. Add new paragraph 3.8.5:

"The *Owner* and the *Contractor* acknowledge and agree that the beneficial ownership of any portion of the *Products* required by the *Contract Documents* to be incorporated and form part of the *Work* shall pass to the *Owner* immediately upon payment therefore or upon incorporation thereof as part of the *Work*, whichever first occurs. For greater certainty, title to *Products* delivered, but not installed, shall pass to the *Owner* when paid for (subject to any applicable holdback). The *Contractor* agrees to promptly execute and deliver to the *Owner*, from time to time as the *Owner* may require, any further documentation required to identify, evidence, perfect or protect the *Owner*'s beneficial, or registered, interest in the *Products*, including, without limitation, any registrations pursuant to the *Personal Property Security Act* (Ontario). Notwithstanding the foregoing, the *Contractor* acknowledges and agrees that it shall continue to bear the risk of loss or damage with respect to the *Work* until the date of acceptance of the *Work* by the *Owner* in accordance with the *Contract Documents*."

SC 21. – GC 3.10 SHOP DRAWINGS

1. Amend paragraph 3.10.1 by adding the following at the end of the paragraph: "or as the *Consultant* may reasonably request".

SC 22. – GC 3.13 CLEAN UP

1. Add paragraph 3.13.4 as follows:

(a) "3.13.4 The *Owner* shall have the right to back charge cleaning to the *Contractor* if it is not done within 24 hours of written notice to clean and the *Owner* shall have the right to back charge cost of damage to the *Place of the Work* caused by *Contractor*'s, *Subcontractor*'s or *Supplier*'s transportation in and out of the *Place of the Work* if not repaired within 5 *Working Days* of written notice to repair or before final payment, whichever is earlier."

SC 23. OPERATIONAL RISKS

1.2 Add new **GC 3.14 - OPERATIONAL RISKS** as follows:

(a) "3.14.1 The position of all pole lines, conduits, water mains, sewers and other underground and overground utilities and structures is not necessarily shown on the Contract *Drawings*, and, where shown, the accuracy of the position of such utilities and structures is not guaranteed. Before starting *Work*, the *Contractor* shall inform himself of the exact locations of such utilities and structures, and shall be liable for damages, as a result of any act or omission, to any utilities identified or reasonably to have been identified, whether or not the result of negligence, by those for whom he is responsible. Unless otherwise specified, the *Contractor* shall temporarily support or relocate such utilities and structures, or temporarily remove them, and restore them, to the satisfaction of the owners of the utilities and structures. The *Contractor* waives any claim and releases the *Owner* and the agents of the *Owner* from all liability for damages suffered as a result of such Contract *Drawings* or any operation required under this paragraph.

3.14.2 Permanent relocation of underground or overhead utilities will be performed and paid for by the *Owner*, if necessitated by coincidence of lines or grades, or both unless

such relocation has been specifically included within the *Work* by the drawings or specifications. The *Contractor* shall be responsible for scheduling permanent relocations of utilities with the *Work.*

3.14.3 The *Consultant* will provide the *Contractor* in writing with bench marks and points of reference to be used by him in setting out the *Work*. The *Owner* will be responsible only for the correctness of the information so supplied. From these bench marks and points of reference the *Contractor* will do his own setting out. The setting out by the *Contractor* shall include but shall not be limited to the preparation of grade sheets, the installation of centre lines stakes, grade stakes, offsets and site rails."

SC 24. – GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

1. Delete paragraph 5.1.1 and paragraph 5.1.2 in their entirety and replace it with "Intentionally Deleted".

SC 25. – GC 5.2 APPLICATIONS FOR PROGRESS PAYMENT

1. Amend paragraph 5.2.2 by adding the following:

"The *Contractor* shall review with the *Consultant* and the *Owner*, at a scheduled time, the percentage of work completed for each item indicated in the schedule of values. This procedure shall be complied with for each application for payment prior to submitting the formal application for payment."

2. Add new paragraph 5.2.8, new paragraph 5.2.9, new paragraph 5.2.10, new paragraph 5.2.11 and new paragraph 5.2.12 as follows:

(a) "5.2.8 The *Contractor* must provide with each application after the first, a sworn statement, in form satisfactory to the *Owner*, certifying that all accounts for the subcontracts, construction machinery and equipment, materials, *Products*, labour and other indebtedness which may have been incurred by the *Contractor* and for which the *Owner* might in any way be held responsible have been paid in full, except for amounts properly retained as holdback or as an identified amount in dispute.

5.2.9 After the first application for payment, with each subsequent application for payment the *Contractor* shall submit evidence of compliance with the applicable worker's compensation legislation at the *Place of the Work*, including payments due thereunder.

5.2.10 The *Contractor* shall submit with each application for payment, payment receipts for products and materials purchased under conditional sales contracts. Authorization for payment of products and materials purchased under conditional sales contracts shall not be made by the *Owner* until evidence of payment is submitted.

5.2.11 Payment by the *Owner* pursuant to the *Contract* shall not preclude the *Owner* from thereafter disputing any of the items involved and shall not be construed as acceptance of any part of the *Work*.

5.2.12 The *Contractor* shall utilize and submit 2 copies of the "*Contractor's* Application for Payment", in a form satisfactory to the *Owner*, when submitting the formal application for payment. In addition, a breakdown of approved *Change Orders* and percentage completed of each shall be included, in a form satisfactory to the *Owner*.

Deviation or incomplete submissions with respect to the approved breakdown will require resubmission of the application for payment."

SC 26. – GC 5.3 PROGRESS PAYMENT

1. Amend paragraph 5.3.1.2 as follows:

   (a) delete "10 calendar days" and replace with "5 Working Days"

2. Amend paragraph 5.3.1.3 to read as follows:

   "the Owner shall make payment to the *Contractor* on account as provided in Article A-5 of the Agreement – PAYMENT on or before 20 Working Days after the date that the certificate for payment is issued by the Consultant."

3. Add the following as new paragraph 5.3.2:

   (a) "5.3.2 If the *Contractor* fails to comply with paragraph 5.2 - APPLICATIONS FOR PROGRESS PAYMENT or paragraph 10.4 – WORKERS COMPENSATION, the *Owner* shall not be required to make payments to the *Contractor* until the obligation has been complied with."

SC 27. – GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK

1. Add the following as new paragraph 5.4.4:

   5.4.4 At the time of issuance by the *Consultant* of the certificate of *Substantial Performance of the Work*, the *Consultant* shall:

   (1) Notify the *Contractor* of the value of the warranty security required by Section 12.3 hereof.

   (2) Prepare a separate certificate (the "*Substantial Performance Payment Certificate*") showing:
   (i) the value of work completed to-date,
   (ii) the value of outstanding or uncompleted work,
   (iii) the value of the required warranty security,
   (iv) the amount of the holdback being held in accordance with the *Construction Lien Act* (allowing for any previous release of holdback to the *Contractor* in respect of completed *Subcontractors*, *Suppliers* and deliveries of pre-selected equipment), and
   (v) the amount due the *Contractor*.

   (3) Prepare a payment certificate releasing to the *Contractor* the holdback held in accordance with the *Construction Lien Act* in respect of *Work* performed up to the date of *Substantial Performance of the Work*. Subject to the provisions of the *Construction Lien Act* (Ontario) and the submission by the *Contractor* of the following documents, such holdback shall become payable after 45 days from the date of publication of the certificate of *Substantial Performance of the Work*:

   (i) A written undertaking by the *Contractor* to complete expeditiously any outstanding *Work* and to discharge all unfulfilled obligations under the Contract;

(ii) The *Contractor*'s final claim for all amounts incurred before and on the date of *Substantial Performance of the Work*;

(iii) A release by the *Contractor* in a form satisfactory to the *Consultant* releasing the *Owner* from all further claims relating to the Contract (except in respect of outstanding work) and other than claims relating to liens under the applicable lien legislation of the *Place of the Work*;

(iv) A Statutory Declaration in a form satisfactory to the *Owner* that all liabilities incurred by the *Contractor* and its *Subcontractors*, and *Suppliers* in carrying out the *Contract* have been discharged and that all liens in respect of the *Contract* and subcontracts thereunder have expired or have been satisfied, discharged or provided for by payment into court; and

(v) A satisfactory Clearance Certificate pursuant to the *Workplace Safety and Insurance Act*."

SC 28. – GC 5.5 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK

1. Amend paragraph 5.5.1.2 as follows:

   (a) replace "CCDC 9A Statutory Declaration" with "a statutory declaration in a form satisfactory to the Owner"

   (b) add "materials," before "labour";

   (c) add "or by any *Subcontractor*, or *Supplier*" after "*Contractor*";

   (d) delete "." and replace with ", and"

2. Add paragraph 5.5.1.3 as follows:

   (a) ".3 submit the documents required to demonstrate compliance under GC 10.4."

3. Amend paragraph 5.5.2 as follows:

   (a) delete "statement as provided in" and replace with "other documents required to be provided pursuant to"

4. Delete paragraph 5.5.3 in its entirety and replace with "5.5.3 INTENTIONALLY DELETED".

5. Amend paragraph 5.5.4 as follows:

   (a) delete "third party monetary claims against the *Contractor* which are enforceable against the *Owner*" and replace with "claims against the *Contractor*".

SC 29. – GC 5.6 PROGRESSIVE RELEASE OF HOLDBACK

1. Delete GC 5.6 in its entirety and replace with "5.6 Intentionally Deleted".

SC 30. – GC 5.7 FINAL PAYMENT

1. Amend paragraph 5.7.1 by adding "as defined in Section 2(3) of the *Construction Lien Act* (Ontario)" after the words "*Work* is completed".

2. Amend paragraph 5.7.4 as follows:

   (a) delete "5 calendar days after" and replace with "20 calendar days after"; and

   (b) delete "." and replace with "provided that the *Contractor* shall provide the *Owner* and the *Consultant*, in a form acceptable to the *Owner*, a sworn statement that all accounts for the materials, labour, subcontracts, *Products*, Construction Equipment and other indebtedness which may have been incurred by the *Contractor* and for which the *Owner* might in any way be held responsible have been paid in full, except for amounts properly retained as a holdback or as an identified amount in dispute and submit the documents required to demonstrate compliance with paragraph 10.4 - WORKERS' COMPENSATION."

3. Add the following as new paragraph 5.7.5:

   At the time of issuance by the *Consultant* of the final certificate of payment, the *Consultant* shall:

   (1) Prepare a certificate (the "*Completion Payment Certificate*") showing:
   (i) the final *Contract Price*,
   (ii) the amount of the further 10 per cent holdback (based on the value of further work completed over and above the value of work completed shown in the *Substantial Performance Payment Certificate*),
   (iii) the value of the required warranty security, and
   (iv) the amount due to the *Contractor*.

   (2) Prepare a payment certificate releasing to the *Contractor* the further 10 per cent holdback. Subject to the provisions of the *Construction Lien Act* (Ontario) and the submission by the *Contractor* of the documents required by the General Conditions, such further 10 per cent holdback shall become payable after 45 days from the date of completion of the *Work* as established by the final certificate of payment.

   If, at the end of the *Warranty Period*, any monies are still being retained by the *Owner* as warranty security or for other reasons, the *Consultant* will issue a certificate (the "Warranty Security Payment Certificate") releasing the monies due the *Contractor*.

SC 31. – GC 5.8 WITHHOLDING OF PAYMENT

1. Amend paragraph 5.8.1 as follows:

   (a) delete "If" and replace with "Subject to applicable lien legislation, if"

SC 32. LIENS

1. Add new GC 5.10 LIENS as follows:

   "GC 5.10 LIENS

   5.10.1 Notwithstanding any other term or condition in the *Contract Documents*, the *Owner* shall not be obligated to make payment to the *Contractor*, if at any time such certificate or payment was otherwise due:

.1 a claim for lien arising from the performance of the *Work* has been registered against the *Place of Work*, or

.2 the *Owner* or mortgagee of the *Place of Work* has received a written notice of lien.

5.10.2 In the event that a construction lien arising from the performance of the *Work* is registered against the *Place of Work*, or given to the Owner, the *Contractor* shall, within 10 calendar days, at its sole expense, vacate or discharge the lien from title to the premises. If the lien is merely vacated, the *Contractor* shall, if requested, undertake the *Owner*'s defence of any subsequent lawsuit commenced in respect of the lien at the *Contractor*'s sole expense.

5.10.3 In the event that the *Contractor* fails or refuses to vacate or discharge a construction lien within the time prescribed above, the *Owner* shall, at its option, be entitled to take all steps necessary to vacate and/or discharge the lien, and all costs and expenses incurred by the *Owner* in so doing (including, without limitation, legal fees on a full indemnity basis, disbursements, the cost of any security to vacate the lien and any payment which may ultimately be made out of or pursuant to security posted to vacate the lien) shall be for the account of the *Contractor*, and the *Owner* may deduct such amounts from amounts otherwise due or owing to the *Contractor*. If the *Owner* vacates the lien, it shall be entitled to retain all amounts it would be required to retain pursuant to the *Construction Lien Act* (Ontario) if the lien had not been vacated.

5.10.4 Without limiting any of the foregoing, the *Contractor* shall indemnify the *Owner* for all costs (including, without limitation, legal fees on a full indemnity basis) it may occur in connection with the claim for lien or subsequent lawsuit brought in connection with the lien, or in connection with any other claim or lawsuit brought against the *Owner* by any person that provided services or materials to the Place of Work which constituted a part of the *Work*.

5.10.5 This GC 5.10 does not apply to construction liens claimed by the *Contractor*."

SC 33. – GC 6.1 OWNER'S RIGHT TO MAKE CHANGES

1. Amend paragraph 6.1.1.2 by adding "or a Change Directive" after "Change Order"

1.3 Add paragraph 6.1.3, paragraph 6.1.4, paragraph 6.1.5, and paragraph 6.1.6, paragraph 6.1.7 and paragraph 6.1.8 as follows:

"6.1.3 The value of a change shall be determined in one or more of the following methods: (a) by estimate and acceptance in a lump sum; (b) by unit prices set out in the Contract or subsequently agreed upon; (c) by cost and a fixed or percentage fee.

6.1.4 Where changes in the *Work* are paid for under method (b) of paragraph 6.1.3, the value of changes is based on the net difference in quantities with the appropriate unit rate applied.

6.1.5 Where changes in the Work are to be paid under method (c) of paragraph 6.1.3, the cost to the Owner shall be the actual cost of credits and where additional work is required, the cost to the Owner shall be the actual cost plus a percentage covering overhead and profit, after all credits included in the change have been deducted. Wherein changes in the Work are to be paid under method (c) of paragraph 6.1.3, an allowance covering overhead and profit shall be calculated as follows:

.1 on Work performed by the *Contractor's* own forces, 10 per cent; and

.2 on Work performed by Subcontractors or Suppliers, five per cent.

6.1.6 If any change in the *Work* is made by which the amount of *Work* to be done is decreased, or if the whole or any portion of the *Work* is dispensed with, the *Owner* shall, subject to paragraph 6.3.3, not be liable to the *Contractor* for any costs or damages whatsoever including, without limitation, any indirect, consequential or special damages, such as loss of profits, loss of opportunity or loss of productivity.

6.1.7 A Change Order shall be a final determination or adjustment in the Contract Time and Contract Price. There shall be no adjustments to the Contract Time or Contract Price or compensation or payment of any kind whatsoever (including, without limitation, claims for loss of productivity) based on the aggregate number, scope or value of changes in the Work whether resulting from Change Order or Change Directive.

6.1.8 It is the express intention of the parties that any claims by the *Contractor* for a change in the Contract Price and/or Contract Time shall be barred unless there has been strict compliance with the requirements of all of PART 6 – CHANGES IN THE WORK and the *Contractor* has notified the Owner and *Consultant*, within the earlier of: (i) ten (10) *Working Days* of any event or circumstance of which *Contractor* has knowledge which provides the *Contractor* with a change in the Contract Price and/or Contract Time pursuant to the terms and conditions of the Contract, or (ii) such other period of time expressly allowed for by the Contract. Such notice from the *Contractor* shall include without limitation, sufficient and adequate information and documentation to allow the *Consultant* and the Owner to properly consider the claim of the *Contractor* (including, without limitation, the cause of the change in the Contract Time, a description of the impact on the change in the Contract Time will have on the critical path of the Construction Schedule and a description of the portions of the Work affected thereby and a breakdown of the change in the Contract Price, together with all pertinent details and all other backup information and documents). The *Contractor* has an ongoing obligation to augment the information and documents described in this paragraph as it becomes available. No course of conduct or dealing between the parties, no express or implied acceptance of alterations or additions to the Work, and no claims that the Owner has been unjustly enriched by any alteration or addition to the Work, whether in fact there is any such unjust enrichment or not, shall be the basis of a claim for additional payment under this Contract or a claim for any extension of the Contract Time."

SC 34. - GC 6.3 CHANGE DIRECTIVE

1. Delete GC 6.3.2 and replace it with "Intentionally Deleted"

2. Amend paragraph 6.3.7.1 by adding "while directly engaged in the work attributable to the change" after "in the direct employ of the *Contractor*".

3. Amend paragraph 6.3.7.1(2) as follows:

   (a) add "required as a result of the change" after "materials or equipment".

4. Amend paragraph 6.3.7.3 by adding "reasonable" before "travel".

5. In paragraph 6.3.7.5, replace the words "and hand tools not owned by the workers" with the words "exclusive of hand tools".

6. In subparagraph 6.3.7.9 insert the words "provided however that the costs included in such amounts shall be limited to the actual costs of the items described in this paragraph 6.3.7 changing "*Contractor*" to "*Subcontractor*" as necessary".

7. And add the following words to the end of paragraph 6.3.7.17: "not caused by the *Contractor* or anyone for whom it is responsible ".

8. At the end of paragraph 6.3.7, add the following:

   "All other costs attributable to the change in the *Work* including the costs of all administrative or supervisory personnel are included in overhead and profit calculated in accordance with the provisions of paragraph 6.1.5 of GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES".

SC 35. – GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

1. In paragraph 6.4.1.1 and paragraph 6.4.1.2, add "or the Reports" after "Contract Documents".

2. In paragraph 6.4.2, insert the words "Having regard to and subject to the liabilities and responsibilities assumed by the *Contractor* pursuant to GC 3.14 – OPERATIONAL RISK," at the beginning of the first and second sentences.

3. Add new paragraph 6.4.5 as follows: "Without limiting the generality of any other provision in the Contract Documents, during the performance of the Work, the *Contractor* shall, as a part of the Contract Price and Work, perform any additional geotechnical and subsurface and other investigations, tests and studies beyond those being provided by the Owner, which a reasonable and prudent contractor would conduct to ascertain the nature and extent of subsurface or otherwise concealed physical conditions at the *Place of the Work*."

SC 36. – GC 6.5 DELAYS

1. Amend paragraph 6.5.1 by deleting "them" in the second line and replacing it with "the *Consultant*" and by replacing the phrase "performance of the Work" in the first line with "performance of a critical path activity on the Construction Schedule".

2. In paragraph 6.5.1, add the following to the end of the paragraph:

   ", provided that the *Owner* shall not be liable for any other costs or damages whatsoever including, without limitation, any indirect, consequential, or special damages, such as loss of profits, loss of opportunity or loss of productivity resulting from such delay."

3. Amend paragraph 6.5.2 as follows:

   (a) replace the phrase "performance of the Work" in the first line with "performance of a critical path activity on the Construction Schedule".

   (b) add "or other entity" after "any person" in the third line.

   (c) In paragraph 6.5.2, add the following to the end of the paragraph:

   ", provided that the *Owner* shall not be liable for any other costs or damages whatsoever including, without limitation, any indirect, consequential, or special damages, such as loss of profits, loss of opportunity or loss of productivity resulting from such delay."

4. In paragraph 6.5.3, replace the phrase "performance of the Work" in the first line with "performance of a critical path activity on the Construction Schedule".

5. In paragraph 6.5.3.1, delete the phrase "labour disputes, strikes, lock-outs (including lock-outs decreed or recommended for its members by a recognized contractor's association, of which the *Contractor* is a member or to which the *Contractor* is otherwise bound)" and replace it with "any labour disputes, strikes or lock-outs affecting the *Work* or the *Project*."

6. Add the following to the end of paragraph 6.5.3:

"provided that the *Owner* shall, in such instance, only be liable for reasonable costs incurred by the *Contractor* and shall not be liable for any other costs or damages whatsoever including, without limitation, any indirect, consequential, or special damages, such as loss of profits, loss of opportunity or loss of productivity resulting from such delay. Notwithstanding the foregoing, the *Contractor* shall use its best efforts to minimize the impact of such event upon the performance of the *Work* and *Contract Time*.

7. In paragraph 6.5.4, add "and Owner" after "*Consultant*" and add the following to the end: "Without limiting the generality of the foregoing, the following shall also apply to the event of delay dealt with by paragraphs 6.5.1, 6.5.2 or 6.5.3:

.1 the notice provided by the *Contractor* as set out in this paragraph 6.5.4 shall include, without limitation, the information and documentation required by paragraph 6.1.8.

.2 the *Contractor* shall take all reasonable steps to minimize the impact of the delay event upon the performance of the Work, the Contract Time and the Contract Price, resume performance of all its obligations under the Contract affected by the delay as soon as practicable and use all reasonable endeavours to remedy any failure to perform.

Failure to adhere strictly to these notice provisions shall constitute a waiver and release of any obligation of the Owner to extend the Contract Time as a result of such delay and of any claim by the *Contractor* for costs as a result of such delay.

8. Add paragraph 6.5.6 as follows:

"6.5.6 If the *Work* should be behind schedule for a reason other than as described in paragraphs 6.5.1 to 6.5.3 (inclusive), or if any of the *Subcontractors* or *Suppliers* or anyone for whom they are responsible delay the progress of any portion of the *Work* necessary to complete the *Work* on schedule, the *Contractor* shall not be relieved of its obligations under the *Contract Documents* and shall use all possible and, if necessary, extraordinary measures to bring the *Work* back on schedule. The *Contractor* shall exercise all reasonable means within its discretion, such as directing any *Subcontractors* or *Suppliers* creating delays to increase their labour forces and equipment, to improve the organization and expediting of the *Work*, or to work overtime as may be necessary. The *Contractor* shall provide any additional supervision, co-ordination and expediting, including overtime by its own personnel as may be required to achieve this end. The costs and expenses incurred by the use of such measures and overtime shall be borne by the *Contractor*, the *Suppliers* and/or the *Subcontractors*."

SC 37. – GC 7.1 OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, OR TERMINATE THE CONTRACT

1. Amend paragraph 7.1.1 by adding "or terminate the *Contract*" after "Work" in the third line.

2. In paragraph 7.1.2 add the words ", fails or neglects to maintain the latest Construction Schedule provided pursuant to paragraph 3.5" immediately following the word "properly" in the first line and delete the words "to a substantial degree and if the *Consultant* has given a written statement to the Owner and the *Contractor* that sufficient cause exists to justify such action."

3. Amend paragraph 7.1.5 by adding "or terminates the *Contract*" after "*Work*" in the first line and by adding "without prejudice to any other right or remedy which is available to the Owner" before "the Owner shall be".

4. Amend paragraph 7.1.5.2 by deleting "until a final certificate for payment is issued".

5. Amend paragraph 7.1.5.3 as follows:

   (a) delete the words "; however, if such costs of finishing the *Work* is less than the unpaid balance of the *Contract Price*, the *Owner* shall pay the *Contractor* the difference".

6. Renumber paragraph 7.1.6 as 7.1.10 and add the following as new paragraphs 7.1.6, 7.1.7, 7.1.8 and 7.1.9:

   "7.1.6 Notwithstanding any other provision in the *Contract Documents*, the *Contract* may be terminated by the *Owner* without cause. Any such termination shall be effected by delivery to the *Contractor* of a notice of termination, specifying the date upon which such termination becomes effective. The *Owner*'s entitlement to so terminate the *Contract* shall be absolute and unconditional and exercisable by the *Owner* in its sole and absolute discretion.

   7.1.7 In the event of any termination by the *Owner* pursuant to paragraph 7.1.6, the *Contractor* shall only be entitled to payment of the following amounts:

   .1 that portion of the *Contract Price* relating to *Work* performed prior to the termination date, as certified by the *Consultant*; plus

   .2 *Subcontractor* and sub-subcontractor cancellation costs (which costs shall not include loss of profit claims) reasonably incurred by the *Contractor* as the result of such termination; provided the *Contractor* has substantiated such costs to the *Owner*'s reasonable satisfaction and after the *Owner* has reviewed the details thereof; plus

   .3 subject in all cases to the *Owner* being informed of all details relating thereto and the prior written approval of the *Owner* being obtained (which approval may not be unreasonably withheld), reasonable demobilization costs defined to include equipment and office dismantling, transportation to *Contractor*'s storage facility, lease or rental cancellation costs, transportation of the *Contractor*'s employees to their home offices, provided each such demobilization cost shall be reasonable and substantiated (to the *Owner*'s reasonable satisfaction) by the *Contractor*.

   7.1.8 Except as described in paragraph 7.1.7, the *Contractor* shall not be entitled to any additional reimbursement on account of any such termination including, without limitation, indirect, special, consequential or other damages, including, without limitation, loss of profits, loss of opportunity or loss of productivity, notwithstanding any other provision of the *Contract Documents*.

   7.1.9 The terms of the Contract, which expressly or by their nature are intended to survive the termination or discharge of the Contract, shall survive such termination or discharge including, without limitation, GC 12.3 - WARRANTY."

SC 38. – GC 7.2 CONTRACTOR'S RIGHT TO STOP THE WORK OR TERMINATE THE CONTRACT

1. Amend paragraph 7.2.2 by deleting "20" and replacing it with "90".

2. Delete paragraph 7.2.3.1 in its entirety and replace with "7.2.3.1 INTENTIONALLY DELETED".

3. Amend paragraph 7.2.3.2 by adding "subject to the other terms and conditions of the *Contract*," before "the *Consultant*".

4. Amend paragraph 7.2.3.3 by adding "subject to the other terms and conditions of the *Contract*," before "the *Owner*".

5. Amend paragraph 7.2.3.4 by deleting the words "except for GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER".

6. Amend paragraph 7.2.3 by adding "and instruct the *Owner* to correct the default in the five (5) *Working Days* immediately following the receipt of such notice." at the end of the paragraph.

7. Delete paragraph 7.2.4. in its entirety, renumber paragraph 7.2.5 as paragraph 7.2.6 and add the following new paragraph 7.2.4 and new paragraph 7.2.5:

> "7.2.4 If the default cannot be corrected in the 5 *Working Days* specified, the *Owner* shall be in compliance with the *Contractor*'s instructions if the *Owner*:
>
> .1 commences the correction of the default within the specified time; and
>
> .2 provides the *Contractor* with an acceptable schedule for such correction, and
>
> .3 corrects the default in accordance with such schedule.
>
> 7.2.5 If the *Owner* fails to correct the default in the time specified or subsequently agreed upon, without prejudice to any other right or remedy the *Contractor* may have, the *Contractor* may suspend the *Work* for not more than 90 days or terminate the *Contract*."

SC 39. – GC 8.1 AUTHORITY OF THE CONSULTANT

1. Amend paragraph 8.1.1 as follows:

   (a) delete "." at the end of the sentence and replace with "if the *Owner* and the *Contractor* both agree. If both parties do not agree to settle the dispute in accordance with GC 8.2 - NEGOTIATION, MEDIATION AND ARBITRATION, then either party may refer the dispute to the Courts."

2. Delete paragraph 8.1.2 and paragraph 8.1.3 in their entirety and replace with:

   "8.1.2 If a dispute is not resolved promptly, or the *Owner* and the *Contractor* cannot agree where agreement is required, the *Consultant* shall give such written instructions as in the *Consultant*'s opinion are necessary for the proper performance of the *Work* and to prevent delays pending settlement of the dispute. The parties shall act immediately according to such instructions, it being understood that by so doing neither party will jeopardize any claim the party may have. If it is subsequently determined that such instructions were in error or at variance with the *Contract Documents*, the *Owner* shall pay the *Contractor* the costs incurred by the *Contractor* in carrying out such instructions which the *Contractor* was required to do beyond what the *Contract Documents* correctly understood and interpreted would have required, including costs resulting from interruption of the *Work*."

SC 40. - GC 8.2 NEGOTIATION, MEDIATION AND ARBITRATION

1. Amend paragraph 8.2.1 by replacing "Rules of Mediation of Construction Disputes as provided in CCDC 40 in effect at the time of bid closing" with "*Rules of Mediation and Arbitration*, as applicable".

2. Amend paragraph 8.2.1.2 by replacing the words "either party by notice in writing requests" with "both parties agree".

3. Amend paragraph 8.2.4 by replacing "Rules of Mediation of Construction Disputes as provided in CCDC 40 in effect at the time of bid closing" with "*Rules of Mediation and Arbitration*, as applicable".

4. Amend paragraph 8.2.6 by replacing "Rules of Arbitration of Construction Disputes as provided in CCDC 40 in effect at the time of bid closing" with "*Rules of Mediation and Arbitration*, as applicable".

SC 41. – GC 9.1 PROTECTION OF WORK AND PROPERTY

1. In paragraph 9.1.1 and paragraph 9.1.3, replace "property adjacent to the *Place of the Work*" with "property adjacent to, in the vicinity of or proximate to the *Place of the Work*".

2. Delete paragraph 9.1.1.1 in its entirety and replace with "9.1.1.1 INTENTIONALLY DELETED"

SC 42 – GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

1. Add the following new paragraphs 9.2.10, 9.2.11 and 9.2.12:

"9.2.10 Neither the *Contractor* nor anyone for whom it is responsible shall bring on to the *Place of the Work* any toxic or hazardous substances and materials except as needed in order to perform the Work. If such toxic or hazardous substances or materials are required, storage in quantities sufficient to allow work to proceed for fourteen (14) calendar days only shall be permitted. All such toxic and hazardous materials and substances shall be handled and disposed of only in accordance with all Laws that are applicable at the *Place of the Work*. Without limiting the generality of any other provision in the Contract, the *Contractor* shall promptly provide the Owner with Material Safety Data Sheets for such toxic or hazardous substances or materials.

9.2.11 The *Contractor* shall indemnify and hold harmless the Owner and *Consultant* and their respective officers, directors, agents and employees, independent contractors from and against any and all liabilities, costs, expenses, and claims resulting from bodily injury, including death, and damage to property of any person, corporation or other entity, that arises from the use by the *Contractor* or anyone for whom the *Contractor* is responsible of any toxic or hazardous substances or materials at the *Place of the Work*.

9.2.12 The *Contractor* shall be familiar with, and comply with, the workplace hazardous materials information system. The *Contractor* shall ensure that all employees and Subcontractors and anyone for whom they are responsible who work with or in proximity to hazardous material fully understand all potential hazards and have been thoroughly trained to deal with any emergencies. Without limiting the generality of the foregoing, all employees and Subcontractors and anyone for whom they are responsible shall be able to:

a) Recognize and understand the labelling on hazardous materials; and

b) Understand material safety data sheets and are knowledgeable on how to safely use, store, handle and dispose of hazardous materials.

The *Contractor* shall ensure all material safety data sheets pertinent to the completion of the Work are at the *Place of the Work*."

SC 43. – GC 10.1 TAXES AND DUTIES

1. Add new paragraph 10.1.3 as follows:

   "The *Contractor* shall provide a detailed breakdown of additional taxes and duties if requested by the *Owner* in a form satisfactory to the *Owner*. Profit and overhead shall not be included in the increase or decrease in costs incurred by the *Contractor* due to changes in the aforementioned taxes and duties".

2. Add new paragraph 10.1.4 as follows:

   "10.1.4 Where an exemption or recovery of government sales taxes, customs duties or excise taxes is applicable to the *Contract*, the parties agree to co-operate with each other to obtain such exemptions. Refunds that are properly due to the *Owner* and have been recovered by the *Contractor* shall be promptly refunded to the *Owner*."

SC 44. – GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

1. Delete paragraph 10.2.2 in its entirety and replace with "10.2.2. Without limiting the generality of any other provision in the *Contract*, the *Contractor* shall obtain and pay for, at its sole expense and cost, all permits (with the exception of the Building Permit, refer to below), development approvals, licences, certificates, charges, refundable deposits, and approvals including, without limitation, site plan approval, water and sanitary sewer permits, water and sewer connection charges, site alteration permits, curb cut and road cut permits, sign permits, hydro approvals, and occupancy permit necessary for the performance of the *Work* and the use and occupation of the *Work* by the *Owner* in accordance with the *Contract Documents*, the cost of which shall all be included in the *Contract Price*. The Contractor shall apply for and obtain the Building Permit, however, the cost of the Building Permit shall be paid directly by the Agency at the time of the application submission."

2. Delete paragraph 10.2.3 in its entirety and replace with the following:

   "10.2.3 The *Contractor* shall comply, and shall require its employees, agents, *Subcontractors*, *Suppliers* and anyone for whom they are responsible to comply, with all laws, ordinances, guidelines, standards, permits, statutes, by-laws, rules, regulations, or codes and all of the *Owner*'s policies and procedures which are or become in force and are applicable to the performance of the *Work* including, without limitation, all those relating to the preservation of the public health, occupational health and safety and to construction safety."

3. Amend paragraph 10.2.5 by replacing "The *Contractor*" with "Subject to paragraph 3.4.1, the *Contractor*".

4. Delete paragraph 10.2.6 in its entirety and replace with the following:

   "10.2.6 If the *Contractor* fails to notify the *Owner* and the *Consultant* in writing, fails to obtain direction as required in paragraph 10.2.5, and/or performs work that it knows or ought to have known that contravenes any laws, ordinances, guidelines, standards, permits, statutes, by-laws, rules, regulations, or codes, the *Contractor* shall be responsible for and shall correct the violations thereof, and shall bear the costs, expenses, and damages attributable to the failure to comply with

the provisions of such laws, ordinances, guidelines, standards, permits, statutes, by-laws, rules, regulations, or codes."

5. Add new paragraph 10.2.8 as follows:

"10.2.8 Without limiting the generality of any other provision in the *Contract Documents*, the *Contractor* shall cause all certificates to be furnished that are required or given by the appropriate governmental or quasi-governmental *Authorities* as evidence that the *Work* as installed conforms with the laws and regulations of *Authorities Having Jurisdiction*, including, without limitation, certificates of compliance for the *Owner*'s occupancy or partial occupancy. The certificates are to be final certificates giving complete clearance of the *Work*, in the event that such governmental or quasi-governmental *Authorities* furnish such certificates."

SC 45. – GC 10.3 PATENT FEES

1. Amend paragraph 10.3.1 by adding "indemnify and" before "hold the" in the second line.

2. In paragraph 10.3.2, add "by the *Owner*" after "supplied to the *Contractor*."

SC 46. – GC 11.1 INSURANCE

1. Replace GC 11.1 with the following:

"GC 11.1 INSURANCE

11.1.1 Without restricting the generality of GC 12.1 – INDEMNIFICATION, the Contractor shall provide, maintain and pay for the following insurance coverage's:

1. Commercial General Liability insurance shall be with limits of not less than **$5,000,000** per occurrence with an annual aggregate limit of not less than **$5,000,000** within any policy year and a deductible not exceeding **$10,000.** The policy shall be maintained for at least twenty-four (24) months from the date of Substantial Performance of the Work.

   The insurance shall be in the name of the Contractor, include the Owner as an additional insured, and include bodily injury including death, personal injury, property damage including loss of use thereof, contractual liability, non-owned automobile liability, owner's and contractor's protective, products and completed operations, employer's liability, contingent employer's liability with coverage including the operations and activities of the Contractor and those for whom the Contractor is in law responsible. The policy shall contain cross liability and severability of interest clauses.

   The insurance coverage shall not be less than the insurance provided by IBC Form 2100, or its equivalent replacement, provided that IBC form 2100 shall contain the latest edition of the relevant CCDC endorsement form and shall include an endorsement with respect to sudden and accidental pollution acceptable to the Owner (including an extension for a standard provincial or territorial form of non-owned automobile liability policy) and IBC Form 2320.

   The policy will include but is not limited to the liability of the insureds arising out of their general supervision, if any, or such operations with respect to safety or otherwise, or arising out of the ownership or control of the premises on which such operations are performed.

All liability coverage shall be maintained for completed operations hazards from the date of Contract Completion on an ongoing basis for a period of six (6) years following the date of Contract Completion.

To achieve the desired limit, umbrella or excess liability insurance may be used. Subject to satisfactory proof of financial capability by the Contractor, the Owner may agree to increase the deductible amounts.

All policies of insurance shall be primary and shall not act as co-insurance or as excess coverage to any policies obtained by the Owner for its sole protection.

Prior to commencement of the Work and upon the placement, renewal, amendment or extension of all or any part of the insurance, the Contractor shall promptly provide the Owner with a certified true copy of the policy(s) by an authorized representative of the insurer together with copies of any amending endorsements or a Certificate of Insurance on the Owner's form evidencing compliance with the policy requirements and endorsed to provide the Owner with not less than 30 days notice in writing in advance of any cancellation, change or amendment restricting coverage.

2. All Risks Contractors' Equipment Insurance covering construction machinery and equipment used by the Contractor for the performance of the Work, including Boiler Insurance on temporary boilers and pressure vessels, shall be in a form acceptable to the Owner and the Landlord shall not allow subrogation of claims by the insurer against the Owner or any and all other parties engaged in the Project. The policies shall be endorsed to provide the Owner with not less than 30 days notice in writing in advance of cancellation, change, or amendment restricting coverage.

4. Standard Exclusions

4.1 In addition to the broad form property exclusions identified in IBC 4042 (1995) and 4047 (2000), the Contractor is not required to provide the following insurance coverages:

Cyber Risk
Terrrorism

11.1.2 Prior to commencement of the Work and upon the placement, renewal, amendment, or extension of all or any part of the insurance, the Contractor shall promptly provide the Owner with confirmation of coverage and, if required, a certified true copy of the policies certified by an authorized representative of the insurer together with copies of any amending endorsements applicable to the Work or Certificate of Insurance on the Owner's form evidencing compliance with the policy requirements and endorsed to provide the Owner with not less than 30 days notice in writing in advance of any cancellation, change or amendment restricting coverage.

11.1.3 The parties shall pay their share of the deductible amounts in direct proportion to their responsibility in regards to any loss for which the above policies are required to pay, except where such amounts may be excluded by the terms of the Contract.

11.1.4 If the Contractor fails to provide or maintain insurance as required by the Contract Documents, then the Owner shall have the right to provide and maintain such insurance and give evidence to the Contractor and the Consultant. The Contractor shall pay the cost thereof to the Owner on demand or the Owner may deduct the cost from the amount which is due or may become due to the Contractor.

11.1.5 All required insurance policies shall be with insurers licensed to underwrite insurance, in the Province of Ontario and shall be at the approval, not unreasonably withheld, of the Owner."

SC 47. – GC 11.2 CONTRACT SECURITY

1. Amend paragraph 11.2.2 by deleting "latest edition of CCDC approved bond forms" with "forms attached as Attachment 1 hereto and with a surety company satisfactory to the *Owner*."

2. Add the following as new paragraph 11.2.3:

"11.2.3 The *Contractor* shall, as part of the *Contract Price*, provide a Performance Bond with a face value of (specify percentage) of the *Contract Price* and a Labour and Material Payment Bond with a face value of (specify percentage) of the *Contract Price*. The Performance Bond must remain in effect for a period of not less than the full duration of the *Warranty Period* under the *Contract*."

SC 48. – GC 12.1 INDEMNIFICATION

1. Delete paragraph 12.1.1 in its entirety and replace with the following:

12.1.1 The *Contractor* shall indemnify the Owner, the *Consultant* and their respective officers, council members, partners, agents, employees, servants, insurers, advisors, consultants, contractors, successors and assigns (collectively the "Indemnified Parties"), and save them harmless from and against any and all claims, demands, losses, costs, damages, actions, causes of action, suits or proceedings and all other liabilities, losses and expenses including bodily injury or death to any Person or loss or damage to property, court costs, interest, legal fees, adjusting fees and disbursements (collectively "claims") made against or suffered or incurred by the Indemnified Parties, directly or indirectly and which arise from or are connected with:

.1 any failure or alleged failure by the *Contractor* (or any Subcontractor, Supplier or anyone for whom the *Contractor* and/or its Subcontractors and Suppliers may be responsible) to comply with the Contract Documents including any applicable Laws or Regulations, including provincial workers' compensation laws or regulations;
.2 any infringement or alleged infringement by the *Contractor* (or any Subcontractor, Supplier or anyone for whom the *Contractor* and/or its Subcontractors and Suppliers may be responsible) of any intellectual property right including without limitation any misuse, passing off or infringement or alleged infringement of trade-marks;
.3 any defective or potentially hazardous goods used by the *Contractor* (or any Subcontractor, Supplier or anyone for whom the *Contractor* and/or its Subcontractors and Suppliers may be responsible);
.4 any form of theft, fraud, or illegal activity by the *Contractor* (or any Subcontractor, Supplier or anyone for whom the *Contractor* and/or its Subcontractors and Suppliers may be responsible) or any of their respective agents, directors, officers, or employees;
.5 any wilful act, omission or negligence of the *Contractor* (or any Subcontractor, Supplier or anyone for whom the *Contractor* and/or its Subcontractors, and Suppliers may be responsible), or any of their respective agents, directors, officers, servants, contractors or employees;
.6 any negligence by the *Contractor* (or any Subcontractor, Supplier or anyone for whom the *Contractor* and/or its Subcontractors, and Suppliers may be responsible) directly or indirectly arising or contributing to or alleged to arise out of the *Contractor*'s performance of or the failure to perform the Work, or out of the conditions of the work, the job site, adjoining land, driveways, streets or alleys used in connection with the performance of the Work under this Contract;

.7 any negligence, errors or omissions, or monies owing to the Owner for claims payable under this indemnity due to failure of any insurance required of Subcontractors, Suppliers or subsubcontractors thereof as retained by *Contractor*,
but shall not include any claims arising solely from the active negligence of the party asking to be defended, indemnified or saved harmless.

2. Delete paragraphs 12.1.2 and 12.1.3 in their entirety and replace each with "INTENTIONALLY DELETED."

SC 49. – GC 12.2 WAIVER OF CLAIMS

1. Delete paragraph 12.2 in its entirety and replace with the following:

"12.2 WAIVER OF CLAIMS

12.2.1 Subject to any rights or remedies provided by the *Construction Lien Act*, as of the date of the final certificate for payment, the *Contractor* expressly waives and releases the Owner from all claims against the Owner including, without limitation, those that might arise from the negligence or breach of contract by the Owner except:

.1 those made in writing in compliance with the Contract Documents prior to the *Contractor's* application for final payment and still unsettled; and

.2 those arising from the provisions of GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES AND MATERIALS or GC 10.3 PATENT FEES

SC. 50 – GC 12.3 WARRANTY

1. Delete paragraph 12.3.1 in its entirety and replace it with the following:

(a) "The *Contractor* agrees to remedy, at its costs, any defects in materials and workmanship which are identified by the Owner within a period of 24 months (except where otherwise noted for a longer period of time in the *Contract Documents*) from the date of *Substantial Performance of the Work* (the "*Warranty Period*"). This warranty shall cover labour and material, including, without limitation, the costs of removal and replacement of covering materials. This warranty shall not limit extended warranties on any items of equipment or material called for elsewhere in the specifications or otherwise provided by any manufacturer of such equipment or material."

2. Amend paragraph 12.3.3 by replacing "one year" with "24 months".

3. Amend paragraph 12.3.4 by replacing "one year" with "24 months".

4. Add the following to paragraph 12.3.5:

"The carrying out of the replacement work and making good of defects shall be executed at such times as convenient with the *Owner* which may entail overtime work on the part of the *Contractor*. Additional charges for overtime work in this regard must be borne by the *Contractor*."

5. Delete paragraph 12.3.6 and add the following new paragraph 12.3.6, paragraph 12.3.7, paragraph 12.3.8 and paragraph 12.3.9:

"12.3.6 Any material or equipment requiring excessive servicing during the *Warranty Period* (or free maintenance period, if applicable) shall be considered defective and the warranty (or free maintenance period) shall be deemed to take effect from the time that the defect has been corrected so as to cause excessive servicing to terminate.

12.3.7 The final payment certificate shall not relieve the *Contractor* from its responsibility under this GC 12.3 - WARRANTY.

12.3.8 Following *Substantial Performance of the Work*, and without limiting the *Contractor*'s warranty under this GC 12.3, the *Contractor* shall assign to the *Owner*, to the extent assignable, the benefit of all warranties and guarantees relating to the *Work*. The assignment shall expressly reserve the right of the *Contractor* to make any claims under such warranties and guarantees and such assignment shall in no way prejudice any rights of or benefits accruing to the *Contractor* pursuant to such warranties and guarantees.

12.3.9 The provisions of the GC 12.3 – WARRANTY shall not deprive the *Owner* of any action, right or remedy otherwise available to the *Owner* for the *Contractor*'s failure to fulfill its obligations or responsibilities under the *Contract* and shall not be construed as a waiver of claims in favour of the *Contractor* or as a limitation on the time in which the *Owner* may pursue such other action, right or remedy. The warranties set out in the *Contract* are not supplemental to and do not limit or preclude the application of any other conditions and warranties, express or implied, by law or trade usage."

6. Add the following as new paragraph 12.3.10:

"12.3.10 WARRANTY SECURITY

The *Contractor* shall, except as otherwise provided herein, provide to the *Owner* for the duration of the *Warranty Period* a warranty security, the value of which shall be calculated in accordance with the following table:

CONTRACT PRICE		**VALUE OF WARRANTY SECURITY $**
FROM $	**TO$**	
Less than 0.1M		4 per cent of Final *Contract Price*
0.1 M	0.5 M	4,000 on first 0.1 M + 3.0 per cent on next 0.4M
0.5 M	1.0 M	16,000 on first 0.5 M + 2.4 per cent on next 0.5M
1.0 M	2.0 M	28,000 on first 1.0 M + 2.2 per cent on next 1.0M
2.0 M	4.0 M	50,000 on first 2.0 M + 2.0 per cent on next 2.0M
4.0 M	6.0 M	90,000 on first 4.0 M + 1.8 per cent on next 2.0M
6.0 M	10.0 M	126,000 on first 6.0M + 1.5 per cent on next 4.0M
Over 10.0 M		186,000 on first 10.0M + 1.0 per cent on balance

The warranty security, which shall, at no time, be a part of the statutory lien holdback, shall be retained by the *Owner* in increments from monies that would otherwise be payable to the *Contractor*, commencing during the latter part of the period of construction, so that by the date of *Substantial Performance of the Work* the full value of the required warranty security has been retained.

The *Contractor* may apply in writing to the *Owner* at the time of *Substantial Performance of the Work* to substitute for the monies retained as the warranty security an alternative warranty security of equivalent or greater value comprising:

a) one or more irrevocable letters of credit, or

b) another readily negotiable security.

Acceptance of any such alternative shall be at the sole discretion of the *Owner*.

Following receipt and acceptance of any such alternative security by the *Owner*, the *Consultant* shall release to the *Contractor* the monies previously retained for warranty security purposes.

The *Owner* may, at its discretion, allow the total warranty security to be made up in part of monies retained under the *Contract* and in part of an alternative warranty security as indicated in (a) and (b) above provided that the total value of such parts, as determined by the *Owner*, shall be not less than the required value as derived from the table set out above.

If there are no deficiencies existing at the point in time which is 12 months after the beginning of the Warranty Period, the *Contractor* shall be entitled to apply for a release of 80 per cent of the Warranty Security then being held provided that the Warranty Security shall not be reduced below $5,000.

Such alternative warranty security or the monies derived therefrom, less any deductions made as provided for in the *Contract*, shall be released to the *Contractor* following the issuance by the *Consultant* of a Warranty Security Payment Certificate.

SC 51. MISCELLANEOUS

1. Add new PART 13 MISCELLANEOUS as follows:

"PART 13 MISCELLANEOUS

GC 13.1 REVIEW BY OWNER AND REVIEW BY CONSULTANT

13.1.1 Neither the *Owner*'s and/or *Consultant*'s receipt, review or approval of any documents or the *Work* nor the failure of the *Owner* and/or *Consultant*'s to provide comment shall limit, waive or diminish the *Contractor*'s obligations, responsibilities, duties or liabilities under the *Contract*. The review or approval by the *Owner* and/or *Consultant* is intended only to ascertain that the document or the performance of the *Contractor*'s duties, liabilities, responsibilities or obligations under the *Contract* including, without limitation, the *Work* generally meets the intention of the *Contract* and is not an assurance or confirmation of the adequacy, quality, fitness, suitability or correctness of the *Contractor*'s obligations, responsibilities, duties and liabilities under the *Contract* including, without limitation, the *Work*, for which the *Contractor* is solely responsible in accordance with the *Contract*.

GC 13.2 CARE AND SKILL

13.2.1 The *Contractor* acknowledges, confirms, represents and warrants to the *Owner* that:

.1 in performing the *Work*, it shall at all times exercise the degree of care and skill that ought to be exercised by contractors in performing work of the nature contemplated herein; and

.2 it has the necessary experience, skill and expertise required to enable it to fulfill its obligations, duties, liabilities, and responsibilities herein.

GC 13.3 USE AND/OR OCCUPATION OF COMPLETED PORTIONS OF THE WORK

13.3.1 Upon the *Owner*'s request, the *Owner* shall, at any time or times, have the right of occupying and/or using any part or parts of the *Work* (including, without limitation, for the purposes of installing and testing fittings and equipment), whether partially performed

or entirely complete, or whether completed on schedule or not, before the completion of the *Work*.

13.3.2 In the event the *Owner* desires to exercise the privilege of occupancy and/or use of the *Work* as provided above, the *Contractor* shall co-operate with the *Owner* throughout in making available for the *Owner*'s use such building services as heating, ventilation, cooling, water, lighting and telephone for the space or spaces to be occupied and/or used, and if the equipment required to furnish such services is not entirely completed at the time the *Owner* desires to occupy and/or use the aforesaid space or spaces, the *Contractor* shall make every reasonable effort to complete same as soon as possible to the extent that the necessary equipment can be put into operation and use and any extra cost beyond that originally required to complete the *Work* arising from such early occupancy and/or use shall be borne by the *Owner*.

13.3.3 In the event that the *Owner* exercises the privilege of occupancy and/or use of the *Work* as provided above, it agrees to do so, so as not to materially interfere with the respective work of the *Contractor*, *Subcontractors* or *Suppliers* and under the understanding that the *Owner* will be occupying premises within a construction site which will require compliance with all normal construction site requirements including, without limitation, health and safety requirements.

13.3.4 It shall be understood, however, that the *Owner*'s occupancy and/or use of such space or spaces of the *Work* shall not constitute the *Owner*'s acceptance of any *Work*, materials or equipment which are not in accordance with the requirements of the *Contract Documents*, nor affect the warranty period under the *Contract*, nor relieve the *Contractor* from his obligations, duties, responsibilities, and liabilities to complete the *Work*, nor for responsibility for loss or damage due to or arising out of defects in, or malfunctioning of, any *Work*, material or equipment, nor from any other unfulfilled duties, liabilities, obligations or responsibilities under the *Contract* nor from any other duty, liability, obligation or responsibility under the *Contract* including, without limitation, the *Contractor*'s warranty obligations. If, however, damage results from any act by the *Owner*, the *Owner* shall assume its share of the responsibility for such damage.

GC 13.4 NON-INTERFERENCE

13.4.1 The *Contractor* acknowledges that the *Place of the Work* is and will continue to be occupied by the *Owner* and the *Owner* will continue to carry out its normal operations at the *Place of the Work*. The *Contractor* agrees to perform the *Work* in the least intrusive manner possible. Without limiting the generality of the foregoing, the *Contractor* acknowledges and agrees that it shall carry out its duties, responsibilities, and obligations under the Contract in such a manner so as not to disrupt or interfere with any of the *Owner*'s or any third party's existing facilities and ongoing operations or activities or other operations located in the area adjacent to, in the vicinity of or proximate to the *Place of the Work*.

GC 13.5 LIQUIDATED DAMAGES

13.5.1 It is expressly agreed by the parties that if the date of *Substantial Performance of the Work* occurs later than the *Substantial Performance Date*, the *Contractor* shall pay to the *Owner* liquidated damages calculated as $565 for each calendar day that *Substantial Performance of the Work* extends beyond the *Substantial Performance Date*. It is expressly agreed that it is difficult to calculate the damages which would result from the *Contractor*'s failure to attain *Substantial Performance of the Work* by the S*ubstantial Performance Date*, and the parties agree that the liquidated damages are not intended to

be penalties but rather represent the parties' best estimate of damages resulting from the delay.

13.5.2 In the event that the Owner or the Consultant reasonably determine that the Contractor is not progressing in accordance with the Schedule due to circumstances within their control, with the result that the Contractor will not achieve Substantial Performance of the Work by the Substantial Performance Date, the Owner will commence to hold back amounts from payments due to the Contractor totalling an amount sufficient to cover the Consultant's estimate of liquidated damages that may be payable pursuant to paragraph 13.5.1. In the event that the Owner hold backs more than is owed pursuant to paragraph 13.5.1, it shall forthwith pay such excess to the Contractor.

13.5.3 The *Owner* may deduct any amount due under this paragraph from any monies that may be due or payable to the *Contractor* on any account whatsoever. The liquidated damages payable under this paragraph are in addition to and without prejudice to any other remedy, action or other right that may be available to the *Owner*.

GC 13.6 DAMAGES AND MUTUAL RESPONSIBILITY

13.6.1 If either party to the Contract should suffer damage in any manner because of any wrongful act or neglect of the other party or of anyone for whom the other party is responsible in law, then that party shall be reimbursed by the other party for such damage. The reimbursing party shall be subrogated to the rights of the other party in respect of such wrongful act or neglect if it be that of a third party.

13.6.2 Claims for damage under paragraph 13.6.1 shall be made in writing to the party liable within reasonable time after the first observance of such damage and if undisputed shall be confirmed by Change Order. Disputed claims shall be resolved as set out in Part 8 for the General Conditions – DISPUTE RESOLUTION.

13.6.3 If the *Contractor* has caused damage to the work of another contractor on the Project, the *Contractor* agrees upon due notice to settle with the other contractor by negotiation or arbitration. If the other contractor makes a claim against the Owner on account of damage alleged to have been so sustained, the Owner shall notify the *Contractor* and may require the *Contractor* to defend the action at the *Contractor*'s expense. The *Contractor* shall satisfy a final order or judgement against the Owner and pay the costs incurred by the Owner arising from such action.

13.6.4 If the *Contractor* becomes liable to pay or satisfy a final order, judgment, or award against the *Owner*, then the Contractor, upon undertaking to indemnify the *Owner* against any and all liability for costs, shall have the right to appeal in the name of the Owner such final order or judgment to any and all courts of competent jurisdiction.

GC 13.7 RIGHT OF SET-OFF

13.7.1 The Owner has the right to set-off against the balance due or to become due to the *Contractor* under the Contract, any reasonable and substantiated amounts due or to become due from the *Contractor* to the Owner under the Contract.

GC 13.8 SOFTWARE

13.8.1 Without limiting the generality of any other provision in the Contract, the *Contractor*, as a part of the Work, shall supply and install all software required by the Contract Documents or included with any systems required by the Contract Documents

("Software"). The *Contractor* shall grant or obtain a perpetual, irrevocable non-exclusive royalty-free license to use the Software sufficient for the Owner's purposes."

Form of Tender (Page 1 of 8)

I, We, the undersigned, having examined the Document, do hereby submit an offer to enter into an agreement with the Agency, to provide **INTERIOR RENOVATION OF REGION OF PEEL PUBLIC HEALTH CLINIC AT 7205 GOREWAY DRIVE, MISSISSAUGA**, in accordance with the Document.

1. **DOCUMENT SUBMISSION**

Document Submission shall be irrevocable and open for acceptance for the Bid Acceptance Period, a period of 90 days following the date of the Document Submission closing.

The Vendor submits that they have thoroughly reviewed this document together with the following Addenda and hereby accepts and agrees to all provisions and conditions stated therein and has included fully for all requirements in the Pricing:

Addendum Number _____ Dated _____

Addendum Number _____ Dated _____

Addendum Number _____ Dated _____

Addendum Number _____ Dated _____

Addendum Number _____ Dated _____

Addenda can be viewed online at the Region of Peel Web site www.peelpurchasing.ca.

2. **REFERENCES**

Please give the **names** of three clients, other than the Agency, who have similar projects and for whom you are performing or have performed similar Work.

Company	Phone	Contact Person	Estimated Contract Amount	Year	Project/ Contract Number
1.			$		
2.			$		
3.			$		

3. **LIST OF SUPPLIERS AND SUB-CONTRACTORS**

The vendor also agrees that the following is a complete list of suppliers and sub-contractors that will be required in the performance of the Work and that no additions, deletions or changes to this list will be permitted without the approval of the Agency.

State **OWN FORCES** if a sub-contractor is not required for any of the trades listed. If additional trades are required, insert in blank spaces.

Supplier and/or Sub-Contractor	Address	Trade
1.		
2.		
3.		
4.		

4. **STATEMENT OF EXPERIENCE**

The following is a statement of the Vendor's experience in carrying out comparable Work. The Agency may contact those named below to verify the Vendor's statement and to assess the Vendor's ability to carry out the Work.

Description of Contract	For Whom Work Performed	$ Value	Year
1.			
2.			
3.			
4.			

5. **TIME OF COMPLETION**

The Contractor agrees to have the Works "Substantially Performed" in accordance with this document within eight weeks after written order for commencement of the Work by the Owner and not later than **March 31, 2014.**

The Contractor agrees that they will deliver the whole of the Works completed in accordance with this document within ten weeks after written order for commencement of the Work by the Owner and not later than **April 10, 2014.**

6. **CONTACT INFORMATION**

In the space provided please list the contact names and numbers during:

Description	Regular Hours Service (7:00 a.m. - 5:00 p.m.)	After Hours Service (5:00 p.m. - 7:00 a.m.)	Saturdays, Sundays and Holidays
Name			
Phone number			
Cellular number			
Pager number			
Answering Service number			

7. **G.S.T./H.S.T. REGISTRATION NUMBER**

Please provide in the space below your G.S.T./H.S.T. Registration Number. Please note that all invoices provided to the Agency must show the G.S.T./H.S.T. Registration Number and show this tax on a separate line.

G.S.T./H.S.T. Registration Number _____

8. **PRICING**

Prices are to be provided in Canadian dollars and are all inclusive of the cost of labour, materials and equipment required to complete the Work, including but not limited to all applicable taxes, overheads, profits and all other associated Vendor expenses except HST. The Vendor acknowledges by signature hereunder that it has verified for itself the extent of the Work referenced by this document and provide proper completion of the Work for the Stipulated Contract Price of:

8.1 **Pricing Table**

ITEM	DESCRIPTION	UNIT	PRICE
1	Interior Renovation of Region of Peel Public Health Clinic At 7205 Goreway Drive, Mississauga	Lump Sum	$
2	**Cash Allowances**	Lump Sum	$50,000
3	**Contingency Allowance**	Lump Sum	$10,000
	GRAND TOTAL (Excluding Taxes)		*$

***(Transfer this amount to the cover page)**

Dollars

The above stated Price includes fully for all increases, for whatever cause, in cost or price of labour, materials, products, equipment, or consumables. Escalation shall not apply for the duration of the Contract.

The above stated Price includes the payment of permits as described in the Supplementary Conditions, and the Cash Allowances.

No allowances or extra consideration on behalf of the Contractor will be allowed by the Owner by reason of additional costs, damages or other difficulties incurred by the Contractor for failure to have fully investigated and determined conditions affecting the Work.

9. **UNIT PRICES**

Unit Prices include supply and installation unless otherwise indicated and shall be based on work specified in Contract Documents. Unit Prices shall apply only in cases of changes to scope of work.

Unit Prices are all inclusive of the costs of labour, materials, equipment, overhead, profit and other related charges including all duties and taxes except HST.

Reinforcing Steel (in place)	Extra	Credit
Standard	/tonne	/tonne
Epoxy-Coated	/tonne	/tonne
Welded Wire Mesh (in place)	/tonne	/tonne
Unit Masonry (in place, including mortar & reinforcing)		
Face Brick	m^2	m^2
240 Concrete block	m^2	m^2
190 Concrete block	m^2	m^2
Structural Steel (in place)		
Rolled shapes with mass less than or equal to 50kg/m	/tonne	/tonne
Rolled shapes with mass greater than or equal to 50kg/m	/tonne	/tonne
HSS members	/tonne	/tonne
Loose steel lintels, loose steel delivered to site for installation by others	/tonne	/tonne
Galvanized steel members	/tonne	/tonne
OWSJ/LSSJ	/tonne	/tonne
Gypsum Board (in place, taped, sanded, & skimmed)		
Gypsum Board Assemblies	m^2	m^2
Painting	m^2	m^2
Acoustic Ceilings (in place, including suspension grid, panels & hangers)	m2	m2
Flooring (in place, including adhesives)		
Resilient Tile Flooring	m^2	m^2
Resilient Sheet Flooring (Linoleum)	m^2	m^2
Ceramic Tile	m^2	m^2
Porcelain Tile	m^2	m^2
Resilient Safety Flooring	m^2	m^2
Epoxy	m^2	m^2

Concrete Floor Sealer	m^2	m^2

10. **FEES FOR CHANGES IN THE WORK**

The following rates and percentage Price Adjustments shall be used if applicable for any approved changes to the work, in accordance with the General Conditions.

Labour: The following schedule of rates are all-inclusive Straight Time and Overtime hourly rates (blended for foreman, journeyman, apprentice) which includes the cost of vacation and statutory holiday pay, burdens, benefits, home office administration and overhead, supervision, and all other indirect costs, overhead and profit. Rates exclude only the Goods and Services Tax.

Trade or Labour Classification	Straight Time Rate Per Hour	Overtime Rate Per Hour
Superintendent		
Carpenter		
Labourer		
Mason		
Masonry Labourer		
Painter		
Iron Worker		
Plumber		
Sheet Metal Worker		
Sprinkler Fitter		
Electrician		
Other (List below)		

Material: The percentage mark-up on Material is five per cent. Material costs shall be calculated using the actual invoiced cost to Contractor plus cost of transportation.

Equipment (Third Party): Rental equipment from arms-length third parties shall be reimbursed at invoiced cost plus five per cent. Reimbursement for transportation is at cost if the equipment is not on site.

Contractor's Subcontractors (Third Party, Arms-Length):

.1 The percentage to be added to the invoiced cost of extra work completed by a Subcontractor to the Contractor is five per cent. Included in this percentage is the applicable compensation to cover the Contractor's supervision, overhead, profit and all other Costs.

.2 The percentage mark-ups, used by the Contractor's Subcontractors shall not exceed Contractor's mark-up rate specified above, unless prior written authorization has been given by the Owner.

Included in overhead and profit are the Contractor's, and Sub-Contractor's, incidental costs including bonding and health and safety.

11. **ADDRESS**

The Contractor does hereby designate the address, given below as the legal address to which all notices, directions or other communication may be served or mailed:

Street _____

City _____ Province _____ Postal Code _____

Telephone _____ Fax _____

Contact Name _____ Title _____

AGREEMENT TO BOND

We, the undersigned, hereby agree to become bound as Surety for

In a Performance Bond and a Labour and Material Payment Bond each in the amount of 50 per cent of the contract amount, and conforming to the Instruments of Contract attached hereto, for the full and due performance of the Works shown as described herein, if the Tender for

is accepted by the Owner.

It is a condition of the Agreement that if the above-mentioned Tender is accepted, application for a Performance Bond and Labour and Material Payment Bond must be completed with the undersigned within seven days of acceptance of Tender related thereto, otherwise this Agreement shall be null and void.

Dated this _____ day of _____, _____.

_____
Name of Bonding Company

_____
Signature of Authorized Person Signing
for Bonding Company (Company Seal)

_____
Position

This Vendor Submission is made entirely in accordance with Document 2013-714T. By your signature hereunder, it is deemed that you have read and agreed to all terms and conditions in the same manner as had such terms and conditions appeared above your signature, and that you have the authority to bind the Vendor.

VENDOR NAME AND ADDRESS: (please provide legally registered name)

_____

_____

TELEPHONE NUMBER: _____ FAX NUMBER: _____

YOUR E-MAIL ADDRESS: _____

COMPANY'S E-MAIL ADDRESS: _____

PER: _____ TITLE: _____
(Please Print)

SIGNATURE: _____ DATE: _____

WITNESS NAME: _____ TITLE: _____
(Please Print)

SIGNATURE: _____ DATE: _____

1. GENERAL

1.1 Precedence

This Section contains Articles prepared which represent Owner's standards and policies. In all cases this Section is intended to be read in conjunction with and to coordination with all other Sections. In case of discrepancy between this Section and other Sections the more stringent articles of any applicable Section shall apply.

1.2 Work Under This Contract

1.2.1 The Contract includes interior alteration of ($181m^2$) (1950 sq. ft.). of leased space in the basement of the Westwood Square located at 7205 Goreway Drive in Malton, Mississauga. The intention of the Work is to make the space suitable for operation of the Region of Peel Public Health Clinic referred to in these specifications as the "Clinic". The Work must be fully coordinated with the Owner of the Westwood Square, Westwood Mall Holding Ltd., referred to in these specifications as the "Landlord". The Contractor shall coordinate with the Landlord all work required to connect the Clinic to the existing building systems, pay for testing of the systems, permits and approvals from authorities having jurisdiction. Work supplied under this Contract shall be completed in every detail for purpose required. Include materials not herein mentioned, but which may be found necessary to complete or perfect portion of the Work in accordance with requirements of this Contract.

1.2.2 The Contractor shall be responsible to immediately identify and advise the Consultant of additional information required to fully complete the Work and to coordinate timely execution within approved schedule.

1.3 Use of Site

1.3.1 Confine the Work to area defined on Drawings. Execute the Work on public or private property under regulations of authorities having jurisdiction.

1.3.2 Assume responsibility for premises assigned to it for performance of the Work.

1.3.3 Execute the Work to cause minimum interference and inconvenience with activities in existing occupied premises and maintain safety to occupants. Coordinate with Landlord approval for use of temporary facilities, garbage disposal, delivery of materials and all other activities and provisions required to complete the Work. Comply with the Landlord's work hours and arrange deliveries and perform activities which interfere with the Landlord's operation at the hours approved by the Landlord. Inform the Landlord of all work requiring their coordination and participation at a minimum of 48 hours in advance. The Contractor shall test all plumbing, gas, fire protection, HVAC and electrical systems within five days of installation. The Contractor shall give two days' prior written notice to the Landlord that test will take place.

1.4 Public Utilities and Services

1.4.1 Verify limitations imposed on the Work by presence of utilities and services, and ensure no damage occurs to them.

1.4.2 Notify service authorities concerned so that they protect, remove, relocate, or discontinue utilities and services, as required.

1.4.3 Make arrangements and pay for connection charges for services required for the Work.

1.4.4 Locate poles, pipes, conduit, wires, fill pipes, vents, regulators, meters, and sanitary services work in inconspicuous locations. If not shown on Drawings, verify location of service work with the Consultant before commencing installation.

1.5 **Specifications**

The Specifications are apportioned into Divisions and Sections for convenience but are read as a whole and neither such apportionment nor anything else contained in the Contract Documents places responsibility upon the Consultant to settle disputes among Subcontractors in respect thereof.

1.6 **Drawings and Specifications**

1.6.1 Drawings and Specifications are intended to be complementary so that Work shown on Drawings and not mentioned in Specifications, or vice versa, is included. Notes on Drawings are intended to describe Work complete and finished in every respect to satisfaction of the Consultant, and ready for use for purpose for which they are intended, notwithstanding that every item necessarily involved may not be particularly mentioned or shown.

1.6.2 Dimension figures on Drawings or in Specifications are to be followed, in preference to measurements by scale. Verify dimensions on site. If discrepancies or disagreements are apparent, report them to the Consultant for adjustment before commencement of the Work concerned. No deviation from Drawings and Specifications to be made without written confirmation from the Consultant.

1.6.3 Assume full responsibility for interpretation of Drawings and Specifications for sequencing of required articles or materials to be built in or provided. Claims for extra cost based on differences in interpretation or intent of Drawings or Specifications by Subcontractors will not be considered.

1.6.4 Requirement indicated on an engineering Drawings or Specifications, but not shown in architectural Drawings or Specifications, or vice versa, is nevertheless a requirement of the Contract. Similarly requirement indicated on one Drawing but not repeated on other Drawings at same location is a requirement of the Contract.

1.7 **Examination of Site, Documents, Surfaces and Conditions**

1.7.1 Carefully examine the Place of the Work and investigate, at no cost or risk to the Owner, matters relating to nature of the Work, means of access and egress, obstacles, rights and interests of other parties which may be interfered with during execution of the Work, conditions and limitations including obstructions, existing structures or facilities, local conditions, actual levels, character and nature of Project, and other consideration which may affect performance of the Work.

1.7.2 Carefully examine extent of the Work to be performed and matters which are referred to in the Contract Documents prior to start of the Work.

1.7.3 Examine the Work and existing conditions to which the Work is to be applied, anchored or connected, and relevant As-built conditions.

1.7.4 Correct unsatisfactory conditions to acceptance of the Consultant, Contractor and concerned Subcontractor prior to commencing the Work. Commencement of the Work implies acceptance of surfaces and conditions.

1.7.5 Each work operation following on a previous work operation of a differing trade, as in finishing and surfacing the Work, is to include a thorough examination of condition of previous work. The conditions found unacceptable, either for commencement of new work or its satisfactory completion, to be reported in writing to the Consultant. Commencement of new work is to be interpreted as an acceptance of suitability of prior work and will not be accepted as a contributing factor to subsequent failure or acceptability of the Work.

1.8 **Quantity of Items**

Where a component, device, item or part of materials or equipment is referred to in singular number, such reference will require provision of as many components, devices, items or parts of material or equipment necessary to complete the Work.

1.9 **Standards and Codes**

1.9.1 Contract forms, codes, specifications, standards, manuals and installation, application and maintenance instructions referred to in these Specifications, unless otherwise specified, amended or date suffixed, to be latest published editions at Bid Closing Date.

1.9.2 Where no standard is referred to, provide materials, products and quality of the Work, which meet requirements of applicable standards of CSA, CGSB, ULC, ASTM, NFPA, applicable regulations, and building code.

1.10 **Discrepancies**

1.10.1 The Contractor shall immediately advise the Consultant in writing of contradictions, discrepancies or errors which are found or noted.

1.10.2 Do not proceed until instructions or clarifications have been confirmed by the Consultant, in writing.

1.10.3 Failure to notify the Consultant will result in the Contractor incurring a responsibility for resulting circumstances, conditions, expenses or cost.

1.11 **Additional Definitions**

1.11.1 Wherever words "approved", "review", "acceptance", "acceptable", "satisfactory", "selected", "directed", "required", "submit", or similar words or phrases are used in standards or elsewhere in the Contract Documents, it will be understood, that words "by (to) the Consultant" follow, unless context provides otherwise.

1.11.2 “Others" Defined: Others in the Contract Documents refer to other trades within framework of this Contract. Any work or material executed outside the Contract is designated "NIC" (Not in Contract), "By Owner", or "By other contractors".

1.12 **Setting out the Work**

1.12.1 Assume full responsibility for and execute complete layout of the Work to required locations, lines and elevations.

1.12.2 Provide devices needed to layout and construct the Work.

1.12.3 Supply such devices as straight edges, templates and as required to facilitate the Consultant's inspection of the Work.

1.13 **Documents on Site**

Maintain at job site, one copy of each of following:

1.13.1 Tender Document including Drawings, Specifications, Addenda, and other modifications to Contract.

1.13.2 Reviewed' or 'Reviewed as Modified' shop drawings.

1.13.3 Project Construction and Shop Drawing Schedules.

1.13.4 Supplemental Instructions, Change Orders, and Change Directives.

1.13.5 Field Test Reports.

1.13.6 Field Review Reports by Consultants.

1.13.7 Reports by the Authorities.

1.13.8 Building and other applicable permits.

1.13.9 Daily log including:

.1 Start and finish date of each trade.

.2 Ongoing log of documentation including date; submitted to Consultant; return by Consultant; status of document revision numbers; accepted for fabrication, installation, ordering.

1.13.10 Material Safety Data Sheet pursuant to WHMIS (*Occupational Health & Safety Act).*

1.13.11 As-built drawings recording as-built conditions, instructions, changes for structure, equipment, wiring, plumbing, et cetera as called for in Section 017300 and Mechanical Divisions 21, 22, 23 and Electrical Divisions 26 and 27, prior to being concealed.

1.13.12 Copies of applicable codes and approved permit documents.

1.13.13 Make above material available to Consultant at their request.

1.14 **Inserts, Anchors and Fasteners**

1.14.1 Use only factory made, threaded or toggle type inserts as required for supports and anchors, properly sized for load to be carried. Place inserts only in members of main structure and not in finishing material.

1.14.2 Where inserts cannot be placed, use factory made expansion shields for light weights only.

1.14.3 Fasteners stressed in withdrawal are not acceptable, except where otherwise specifically shown.

1.14.4 Ensure that metal fastenings are of same materials as metal components being anchored or of a metal which will not set up a galvanic action causing damage to fastening or metal component under moist conditions.

1.14.5 Fastenings for prefinished materials are to be of concealed type unless otherwise indicated.

1.14.6 Metal fastenings and accessories are to be same texture, colour and finish as material on which they occur.

1.15 **Concealing Wiring and Conduit**

Conceal wiring/conduit in finished areas, unless otherwise indicated.

1.16 **Trademark and Labels**

1.16.1 Trademarks and labels, including applied labels, are not to be visible in finished Work in finished areas.

1.16.2 Remove trademarks or labels by grinding, if necessary, paint out where particular surface is being painted or, if on plated parts, replace with new plain plated or non-ferrous metal parts.

1.16.3 The exceptions to this requirement are trademarks and labels, which are essential to obtain identification of mechanical, electrical or other equipment for maintenance and replacement purposes, and for fire resistance and temperature rise ratings.

1.17 **Powder Actuated Fasteners**

1.17.1 Do not use powder actuated fasteners which are stressed in withdrawal in finished Work.

1.17.2 Do not use powder actuated fasteners within 100mm (4") of concrete or masonry edge.

1.17.3 Powder actuated fasteners: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

1.18 **Waste Audits/Plans for Waste Reduction**

1.18.1 Comply with requirements of jurisdictional authorities.

1.18.2 Deliver to nearest appropriate depot materials accepted for recycling by region or municipality having jurisdiction over the Place of the Work, including but not limited to cardboard, paper, plastic, aluminum, steel, and glass. Deliver to nearest appropriate depot scrap and excess gypsum wallboard for recycling of this material. Pay costs for this Work.

1.19 **Use of Premises Prior to Substantial Performance**

The Owner has the right to enter and occupy building, in whole or in part, for purpose of placing fittings and equipment, or for other use, prior to Substantial Performance of the Work if, in opinion of the Consultant, such entry and occupancy does not prevent or interfere with the Contractor in performance of the Work. Such entry is in no way to be considered as an acceptance of the Work in whole, or in part, nor implies acknowledgement that terms of the Contract are fulfilled.

1.20 **Interferences**

1.20.1 Coordinate placement of equipment to ensure that components will be properly accommodated within spaces provided prior to commencement of the Work.

1.20.2 Take complete responsibility for remedial of the Work that results from failure to coordinate aspect of the Work prior to its fabrication/installation.

1.20.3 Ensure that accesses and clearance required by jurisdictional authorities and/or for easy maintenance of equipment are provided in layout of equipment and services.

1.20.4 Where there is uncertainty regarding means and methods of properly accommodating required elements of the Work, prepare interference drawings before orders for equipment and materials are released to suppliers. Pay costs for this Work, and issue such drawings for review to parties involved in the installation the Work

1.21 **Items Provided by Owner for Installation**

1.21.1 Install equipment and furniture supplied by the Owner, as noted on Drawings, during the Work of this Contract. Co-ordinate shipping and delivery with the Owner. Store items provided by the Owner on site, protected from damage. Install completely, and leave in full operating condition, in accordance with manufacturer’s and suppliers’ directions.

1.21.2 N.I.C. (Not in Contract) or S.B.O. (Supplied by Owner) will be used to designate various items of equipment that require the Contactor co-ordination for installation although not supplied within scope of the Work.

1.22 **Preparation of Existing Substrates and Surfaces to be Exposed**

Prepare existing concrete floors wherever new floor finishes are to be applied. Grind smooth and remove paint, patch and make good ready for finished flooring or sealing, to suit manufacturer's requirements for substrate preparation. Grind smooth and remove paint, patch and make good ready for exposed concrete.

1.23 **Seismic Design and Requirements**

1.23.1 Design components of building, as applicable, and comply with requirements of jurisdictional authorities.

1.23.2 Vibrating equipment will receive seismically designed vibration isolation. Only non-vibrating equipment is permitted to be secured to structure. Structural connection will be by means of direct connection to structure by bolting, using rigid seismic restraints, or taut cable restraints. Connection to structure occurs only at locations capable of withstanding forces applied.

1.23.3 The proposed connections and general design of products, equipment and systems will be described in shop drawing format with identification and location of forces imposed on structure. Shop drawings will be stamped by a professional licensed to practice in the place of the Work and have appropriate understanding of issues at hand. Shop drawings will be submitted for review to the Consultant prior to putting the Work in hand. The Consultant will review these shop drawings for loads imposed on structure.

1.24 **Smoking Policy**

Smoking in the Owner's premises is prohibited.

END OF SECTION

1. **ALTERATIONS**

1.1 Where the new work interfaces with existing and where existing work is altered execute necessary cutting and fitting required to make satisfactory connections with existing work. Complete the entire Work in a finished and organized condition, acceptable to the Consultant.

1.2 Make good concrete, masonry, drywall, woodwork, existing drainage and other materials and finishes and the Work that is damaged or disturbed.

1.3 Warranties specified for materials and the Work of this Contract to be applicable in this instance.

1.4 Protect the Owner's and Landlord’s operations, property and personnel.

1.5 Wherever it becomes necessary to alter or interfere with existing work do such work, at times agreed upon by the Owner, Consultant and Contractor.

1.6 Effectively seal off the place of the Work from rest of the building to permit continuation of the Owner's and Landlord’s operations during alterations.

1.7 Erect dust-tight enclosures, sufficient to obviate dispersion of dust and dirt into existing buildings.

1.8 Where existing work is to be made good, the new work will match exactly old work in material, construction and finish unless otherwise noted or specified.

1.9 Co-ordinate work and activities of all trades, taking into account existing installations to assure best arrangement of pipes, conduit, ducts and mechanical, electrical and other equipment, in available space.

1.10 If required, in critical locations prepare interference or installation drawings, or both, showing the Work of all trades as well as existing installations.

1.11 Remove material and debris from buildings and site and leave in clean condition.

2. **MATERIAL STORAGE**

The Owner is not responsible for securing Contractor’s materials on site.

END OF SECTION

1. **GENERAL**

1.1 The Contract Price, and not the cash allowances, includes the Contractor's overhead and profit in connection with such cash allowances.

1.1.1 Expenditures from the Cash Allowance stipulated sum shall be directed by the Consultant in writing. A schedule shall be prepared jointly by the Consultant and the Contractor to show when items called for under cash allowances, so that the progress of the Work is not delayed.

1.2 Unexpended amounts of the Cash Allowances shall be deducted from the Contract Price at completion of the Work.

1.3 The Cash Allowances unless otherwise specified and approved by the Owner and the Consultant, cover the net cost to the Contractor of services, products, construction, machinery and equipment, freight, handling, unloading, storage, supply and installation and other authorized expenses incurred in performing the Work.

1.4 Supply only allowances include:

1.4.1 Net cost of products.
1.4.2 Delivery to Site.
1.4.3 Applicable taxes and duties (excluding HST).

1.5 Supply and install allowances include:

1.5.1 Net cost of products.
1.5.2 Delivery to Site.
1.5.3 Unloading, storing, handling of products on Site.
1.5.4 Installation, finishing, and commissioning of products.
1.5.5 Applicable taxes and duties (excluding HST).

2. **CASH ALLOWANCES**

2.1 Cash allowances do not include mark-ups and installation costs. Include in the Contract Price the Cash Allowance in the amount of fifty thousand dollars, ($50,000) not including HST. The following is the breakdown of the items included in the Cash Allowance:

2.1.1 Allowance No.1: Supply only of finishing hardware (Section 087100), excluding automatic door operators (Section 087113)
2.1.2 Allowance No. 2: Inspection and Testing
2.1.3 Allowance No. 3: Interior Signage
Allowance No. 4: Exterior (common areas inside the shopping mall and the sign on the pylon at street level) Signage
2.1.4 Allowance No.5: Fiber optic conduits from the Police Station on the ground floor of the shopping mall to the IT room at the Clinic
2.1.5 Allowance No.6: Work and devices supplied, installed and verified by the Landlord as indicated on the Drawings and in the Specification
2.1.6 Allowance No. 7: Card readers and wiring by the Owner’s Security Contractor OHM Security Ltd.
2.1.7 Allowance No. 8: Wiring and equipment by the Owner’s Communication Cabling Contractor
2.1.8 Allowance No. 9: Supply and Installation of Furniture as Specified by the Owner.

3. **CONTINGENCY ALLOWANCE**

3.1 Include in the Tender amount a Contingency Allowance in the amount of ten thousand dollars, ($10,000) not including HST.

3.1.1 Expend the Contingency Allowance as directed by the Consultant, in writing, in accordance with the Contract.
3.1.2 The Contractor’s charges for expenses and profit on the Contingency Allowance

expenditure shall not be included in the Contract Price. Refer to the Contract and Supplementary Conditions SC 33.-GC 6.1- Owner's Right to Make Changes for percentage mark-ups.

3.1.3 Such charges shall be added to the net trade cost of each expenditure from the Contingency Allowance at the percentage rates noted in the Contract.

3.1.4 Changes to the Work shall be added to, or deducted from, the Contingency Allowance, not from the Contract Price. The Contract shall be adjusted by Owner's approval, only once-at the end of the project. Credit the Contract with any unused portion of the Contingency Allowance only in the final payment statement.

END OF SECTION

1. **SUBSTITUTIONS**

1.1 **Submission of Substitutions**

1.1.1 Suggestions for substitutions of products and materials must be submitted in accordance with procedures specified in this Section.

1.1.2 Suggested substitutions of products and materials submitted after award of the Contract will be assessed by the Consultant with the understanding that the Consultant's fees to the Owner for reviewing and processing the proposed substitutions will be deducted from the value of the proposed substitution in order to reflect the true value of the substitution to the Owner.

1.1.3 Consultant will review submissions with the understanding that the Contract time will not be altered, due to the necessary time required to review the substitution request submission.

1.1.4 Submission Outline: Proposed substitutions in order to be assessed, must include following topics:

.1 Description of proposed substitution, including detailed comparative specification of proposed substitution with the specified product.

.2 Respective costs of items originally specified and the proposed substitution.

.3 Confirmation of proposed substitution delivery, in writing by product manufacturer.

.4 Compliance with applicable Building Codes and requirements of jurisdictional authorities.

.5 Compatibility with adjacent building materials and components.

.6 Compliance with the intent of the Contract Documents.

.7 Impact on the Contract Time.

.8 Reasons for the request.

1.1.5 Reasons for Request of Proposed Substitutions:

.1 None of the Products of the choices specified are available.

.2 None of the Products of the choices specified are available in sufficient time to prevent delay to the completion of the Contract, (Refer to paragraph titled Availability of Products).

.3 Products equivalent to or better than those specified which will result in a credit to the Contract Price and/or a reduction in the Contract Time.

1.1.6 Substitutions Submitted As Shop Drawings: Substitutions submitted on shop drawings without following requirements of this Section prior to submission of the affected shop drawings will cause the shop drawings to be rejected. Review of shop drawings shall not be construed as approval of substitutions.

1.1.7 Effect of Substitutions on Interface Products and Systems: Proposed substitutions shall include for modifications necessary to adjacent and connecting Products and systems, which may be caused by the acceptance of a substitution. Such modifications will not incur additional cost to the Owner.

1.1.8 Acceptance/Rejection: the Consultant's decision concerning acceptance or rejection of proposed substitutions is final.

END OF SECTION

1. GENERAL

1.1 Perform the Work in compliance with the Contract and be responsible for delays or costs resulting from failure to allow for inspection or coordination, and for replacement or corrective work required.

1.2 **Identification of Systems**

Provide identification of electrical and mechanical system installations and other automated systems or equipment in compliance with the Contract.

1.3 **Commissioning**

Provide testing, adjusting, balancing and certification and commissioning of mechanical and electrical installations and other automated systems or equipment in compliance with the Contract Documents.

1.4 **Systems Demonstrations**

1.4.1 Instruct the Owner and the Landlord of mechanical and electrical installations and other automated systems or equipment, in compliance with the Contract Documents. Provide a minimum of seven day notice prior to demonstrations.

1.4.2 Provide indexed binder of instructions as referenced above, including contact names and telephone numbers.

1.5 **Superintendence**

1.5.1 Provide full time on site superintendent personnel and supporting staff with proven experience in erecting, supervising, testing and adjusting projects of comparable nature and complexity.

1.5.2 The site superintendent shall have overall authority to speak for and represent the Contractor.

1.6 **Co-operation**

1.6.1 Take field dimensions relative to the Work. Fabricate and erect the Work to suit field dimensions and field conditions in an acceptable manner.

1.6.2 Provide forms, templates, anchors, sleeves, inserts and accessories required to be fixed to or inserted in the Work and set in place or instruct separate Sections as to their location.

1.6.3 Supply items to be built in, as required together with templates, measurements, shop drawings and other related information and assistance.

1.6.4 Pay the cost of extra Work and make up time lost as a result of failure to provide necessary information and items to be built in.

1.7 **Dimensions**

Verify dimensions on the Site before commencing shop drawings. Before fabrication commences report discrepancies to the Consultant in writing. Incorporate accepted variances on shop drawings and As-Built records.

1.8 **Co-operation with Owner**

The Owner reserves the right to commence moving equipment into building as soon as areas become available. Co-operate closely with the Owner and coordinate their work to ensure that the Owner's requirements are accommodated.

1.9 **Coordination**

1.9.1 Coordinate and co-operate with work forces to ensure that Work will be carried out expeditiously and in proper sequence.

1.9.2 Make adjustments to allow adjustable work to fit fixed Work. Attend and organize Subcontractor meetings, as required.

1.10 **Building Dimension and Coordination**

1.10.1 Take necessary job dimensions for the proper execution of the Work. Assume complete responsibility for the accuracy and completeness of such dimensions, and for coordination.

1.10.2 Verify that the Work, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearances to adjacent work, as set out by requirements of Drawings, and ensure that work installed in error is rectified before construction resumes.

1.10.3 Check and verify dimensions referring to work and interfacing of services. Verify such dimensions with trade concerned.

1.10.4 Do not scale directly from the Drawings. If there is ambiguity or lack of information, immediately inform and request clarification from the Consultant. Any change through the disregarding of this clause shall be the responsibility of the Contractor.

1.10.5 Details and measurements of any work which is to fit or to conform to work installed shall be taken at the Place of the Work.

1.10.6 Advise Consultant of discrepancies and omissions on Drawings and Specifications, which affect aesthetics, or which interfere with services, equipment or surfaces. Do not proceed with work affected by such items without clarification from the Consultant.

1.10.7 Provide setting drawings, templates and other information necessary for the location and installation of material, holes, sleeves, inserts, anchors, accessories, fastenings, connections and access panels.

1.11 **Interferences and Interference Drawings**

1.11.1 Coordinate placement of equipment to ensure that components will be properly accommodated within spaces provided prior to commencement of the Work.

1.11.2 Take complete responsibility for remedial work that results from failure to coordinate any aspect of the Work prior to its fabrication/installation.

1.11.3 Ensure that accesses and clearance required by jurisdictional authorities or for easy maintenance of equipment are provided in layout of equipment and services.

1.11.4 Prepare interference drawings prior to placing orders for equipment and materials, eliminate uncertainty regarding means and methods of properly accommodating required elements of the Work. Pay costs for this Work and issue such drawings for review to parties involved in the installation of the Work.

1.11.5 Prepare interference drawings to properly coordinate the Work. Interference drawings shall contain requirements of all applicable Divisions.

1.11.6 Interference drawings shall contain information based on shop drawings.

1.11.7 Show ducts as two lines. Show cross sections in key areas, as required, and as defined by Consultant.

1.11.8 Mechanical and Electrical Contractor shall provide interference drawings in uniform scale on clear Mylar to allow overlays to be assembled.

END OF SECTION

1. **ADMINISTRATIVE**

1.1 Schedule and administer bi-weekly meetings with the Contractor and the Consultants throughout the progress of the Work.

1.2 Prepare agenda for and chair such meetings.

1.3 Distribute written notice of each meeting four days in advance of meeting date to the Consultant, Sub-Consultants and the Owner.

1.4 Record the proceedings and submit proceedings to the Consultant and the Owner in draft form for review prior to distribution. Make such changes as directed by the Consultant and the Owner.

1.5 Reproduce and distribute copies of proceedings, within three days after receipt of drafts, to meeting participants and affected parties not in attendance.

1.6 Representative of the Contractor attending meetings shall be authorized to act on behalf of the Contractor. Subcontractors and suppliers do not attend meetings unless authorized by the Owner.

2. **PRECONSTRUCTION MEETING**

2.1 Within seven days after award of the Contract, the Contractor shall request a pre-construction meeting to discuss and resolve administrative procedures and responsibilities.

2.2 The Owner, Consultant, Contractor, field inspectors and Contractor's site superintendent will be in attendance.

2.3 The Consultant shall organize, chair, minute, and prepare agenda for preconstruction meeting

2.4 Agenda to include the following:

2.4.1 Appointment of official representative of participants in the Work.
2.4.2 Status of permits, fees and requirement of authorities having jurisdiction. Action required.
2.4.3 Schedule of the Work, progress scheduling Section 013200
2.4.4 Schedule of submission of shop drawings, mock-ups, samples, colour chips, and items for the Consultant's review and consideration.
2.4.5 Requirements for temporary facilities, site sign, offices, storage sheds, and utilities, fences, Section 015000.
2.4.6 Requirements for notification for reviews. Contractor allows minimum of 48 hours notice to the Consultant for review of the Work.
2.4.7 Delivery schedule of specified equipment, Section 013200.
2.4.8 Site Security, Section 015000.
2.4.9 Contemplated change notices, change orders, supplemental instructions, change directives, procedures, approvals required, markup percentages permitted, time extensions, overtime, administrative requirements.
2.4.10 Owner provided Products, Section 011100.
2.4.11 Record drawings, Section 017300.
2.4.12 Maintenance manuals, Section 017300.
2.4.13 Take-over procedures, acceptance, warranties, Section 017000.
2.4.14 Progress claims, administrative procedures, holdbacks.
2.4.15 Appointment of inspection and testing agencies or firms, Section 014300.
2.4.16 Contractor's safety procedures.
2.4.17 Staging and storage requirements.
2.4.18 Landlord’s requirements: work hours, Health and Safety, notifications.
2.4.19 Coordination of the Work with the Landlord

3. **PROGRESS MEETINGS**

3.1 During course of Work prior to project completion, schedule progress meetings every two weeks and as directed by the Consultant.

3.2 Agenda to include the following:

3.2.1 Review, approval of proceedings of previous meeting.
3.2.2 Review of items arising from proceedings.
3.2.3 Review of Work progress since previous meetings.
3.2.4 Field observations, problems, conflicts.
3.2.5 Problems which impede Construction Schedule.
3.2.6 Review of off-site fabrication delivery schedules.
3.2.7 Review material delivery dates/schedule.
3.2.8 Corrective measures and procedures to regain projected schedule.
3.2.9 Revisions to Construction Schedule.
3.2.10 Progress, schedule, during succeeding work period.
3.2.11 Review submittal schedules (shop drawings, samples, mock-ups): expedite as required.
3.2.12 Maintenance of quality standards.
3.2.13 Pending changes and substitutions.
3.2.14 Review proposed changes for effect on Construction Schedule and on Completion.
3.2.15 Review of status of as-built documents.
3.2.16 Other business.

4. **PRE-TAKEOVER MEETING**

4.1 Prior to application for Substantial Performance of the Work, the Contractor shall schedule the Pre-Takeover Meeting.

4.2 The Agenda shall include the following:

4.2.1 Review, approval of proceedings of previous meeting.
4.2.2 Review of items arising from proceedings.
4.2.3 Review of procedures for Substantial Performance of the Work, Contract Completion and handover of the Work.
4.2.4 Field observations, problems, conflicts.
4.2.5 Review of outstanding contemplated change orders, change orders, Supplemental Instructions that may affect Substantial Performance of the Work.
4.2.6 Problems which impede Substantial Performance of the Work.
4.2.7 Review of procedures for deficiency review.
4.2.8 Corrective measures required. Review of cost-sharing arrangements for Hydro, heating, and other services.
4.2.9 Progress, schedule, during succeeding work period.
4.2.10 Review submittal requirements for warranties, manuals, and all demonstrations and documentation required for Substantial Performance of the Work.
4.2.11 Review of keying and hardware requirements
4.2.12 Review of status of as-built documents and Record Drawings.
4.2.13 Other business.
4.2.14 Status of commissioning, training.

5. **CONTRACT COMPLETION MEETING**

5.1 Prior to application for Contract Completion the Contractor shall schedule a Post-Construction Meeting. Four days prior to date of the meeting, the Consultant shall confirm the date of the meeting based on evaluation of Contract Completion requirements.

5.2 Agenda to include the following:

5.2.1 Review, approval of proceedings of previous meeting.
5.2.2 Confirmation that no business is arising from proceedings.
5.2.3 Confirmation of Completion of the Contract, and handover of reviewed documentation from the Consultant to the Owner.

5.2.4 Confirmation of completion of contemplated change orders, and supplemental instructions.
5.2.5 Problems which impede the Contract Completion.
5.2.6 Confirmation of deficiency completion, with fixed schedule.
5.2.7 Corrective measures required.
5.2.8 Confirmation of cost-sharing arrangements for hydro, heating and other services.
5.2.9 Confirm submittal requirements for warranties, manuals, an all demonstrations and documentation for Contract Completion is in order.
5.2.10 Review of procedures for communication during the post-Construction period.
5.2.11 Handover of reviewed Record Documents by the Consultant to the Owner.
5.2.12 Handover of Contract Completion Insurance policy transcripts by the Contactors.
5.2.13 Submission of the Final Application for Payment by Contractor.

END OF SECTION

1. **CONTRACT TIME AND SCHEDULING OF THE WORK**

Schedule the Work in co-ordination with the Owner's requirements for access and use of the Place of the Work. Prepare Schedules and scheduling of the Work to meet requirements of the Contract Time in accordance with availability of areas of the Place of the Work for performance of the Work.

The Contractor must include in their Contract Price, all costs for overtime work which may be necessary to complete the various portions of the Work, in accordance with the Completion Dates specified in the Form of Tender.

2. **SCHEDULES REQUIRED**

Submit the following schedules:

2.1 Construction Progress Schedule.
2.2 Schedule of submittals for Samples, Mock-ups.
2.3 Product Delivery Schedule.
2.4 Colour and Material Selection Schedule.
2.5 Shop Drawings Schedule.

3. **FORMAT**

3.1 Prepare schedule in form of a Gantt chart
3.2 Provide schedule for each Work activity.
3.3 Provide horizontal time scale identifying first day of each week.
3.4 Show the Work schedule base line and critical path activities.

4. **SUBMISSION**

4.1 Submit the Construction Schedule within seven days after award of the Contract.
4.2 Distribute copies of schedule to concerned parties for review prior to submission to the Consultant. After review by concerned parties, submit schedules to the Consultant.
4.3 Instruct recipients to report problems anticipated by timetable shown in schedule to be reviewed, within seven days.
4.4 The Consultant will review schedules and return reviewed copy within five working days after date of receipt.
4.5 Resubmit finalized schedules within two days after return of reviewed copy.
4.6 Update and submit the Construction Progress Schedule with each application for payment.

5. **CONSTRUCTION PROGRESS SCHEDULE**

5.1 Include complete sequence of construction activities, including provision for climate and weather.
5.2 Include dates for the commencement and completion of each major element of construction according to specification Sections list.
5.3 Show projected percentage of completion for each item as of the first day of each week.
5.4 Show dates for completion of the Consultant’s decisions regarding material and colour selections, in a detailed line item basis.
5.5 Submit a draft Construction Progress Schedule for review prior to each application for payment, and incorporate responses to comments identified by the Consultant and/or Owner in the final version.
5.6 Show dates for commencement and completion of inspection and testing activities.
5.7 At each date of submission of the Construction Progress Schedule, indicate progress of each activity. Show changes occurring since previous submission of the Construction Progress Schedule, including but not limited to:
    5.7.1 Major changes in scope.
    5.7.2 Activities modified since previous submission.
    5.7.3 Revised projections of progress and completion.
    5.7.4 Other identifiable changes.
    5.7.5 Provide a narrative report to define:
        .1 Problem areas, anticipated delays, and impact on the schedule.
        .2 Corrective action recommended and its effect.

.3 Colour and material selections and other decisions required from the Consultant.

6. **SUBMITTALS SCHEDULE**

6.1 Include time allowed for review of submittals by the Consultant.

6.2 Include time allowed for selection of materials and colours by the Consultant.

6.3 Indicate dates for submitting, review time, resubmission time, float time, last date for meeting the Construction Progress Schedule.

7. **PRODUCT DELIVERY SCHEDULE**

Include dates for delivery of equipment, materials, finish items, factory-finished manufactured items. Show last dates for order, shipment, and delivery in order to meet the Construction Progress Schedule.

END OF SECTION

1. **GENERAL REQUIREMENTS**

1.1 Notify Consultant, in writing, of changes made on submittals from the Contract Documents. The Consultant's review of submittals shall not relieve the Contractor of responsibility for changes made from the Contract Documents not covered by the Contractor's written notification to the Consultant.

1.2 Review of submittals by the Consultant is for the sole purpose of ascertaining conformance with the general design concepts. This review shall not mean that the Consultant approves the detail design inherent in the submittals, responsibility for which shall remain with the submitting Contractor. Such review shall not relieve the Contractor of responsibility for errors or omissions in the submittals, or responsibility for meeting requirements of the Contract Documents. Be responsible for dimensions to be confirmed and correlated at the Site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the Work.

1.3 Assume responsibility for conflicts occurring in the Work which result from lack of comparison and coordination of submittals of the Work.

1.4 Consultant's review and markings on submittals does not authorize the changes in the Work, Contract Price and Contract time.

1.5 The Work shall conform to reviewed submittals subject to above conditions. Review submittals for conformity to the Contract Documents before submitting to the Consultant. Submittals shall bear stamp of the Contractor and signature of a responsible official in the Contractor's organization indicating in writing that such submittals have been checked and coordinated by the Contractor. The Contractor's review shall be performed by qualified personnel having detailed understanding of elements being reviewed and of the Site conditions proposed for installation.

1.6 Make submittals with reasonable promptness and in an orderly sequence so as to cause no delay in the Work. Be responsible for delays, make up time lost and pay added costs incurred because of not making submittals in due time to permit proper review by the Consultant.

1.7 Submittals containing substitutions will be rejected. Substitutions are permitted only on substitution submittals as specified in Section 012500.

2. **SCHEDULE OF SUBMITTALS**

2.1 Before commencement of the Work, provide the Consultant with a detailed schedule of submittals required by the Contract Documents. In addition to such list of submittals, provide other submittals as may be reasonably requested, as are available to the Contractor, to coordinate the Work and to provide the Owner with choices available, within the scope of the Contract Documents.

2.2 Make provisions in schedule for at least three to five working days for the Consultant's review of submittals.

3. **CERTIFICATION AND TRANSCRIPTS**

3.1 Immediately after award of the Contract, submit Workplace Safety and Insurance Board status and transcript of insurance and bonding.

3.2 Submit Workplace Safety and Insurance Board Clearance Certificate with each progress claim and for Substantial Performance of the Work claim.

4. **SHOP DRAWING SCHEDULE**

Provide a detailed Shop Drawing Schedule for each trade immediately after the Contract award, predicated on a bar chart analysis plotted to a time scale (in calendar days). Indicate sequence of submittal dates, review turn-around time, second submission and latest fabrication commencement date.

5. **SCHEDULE OF VALUES**

Submit a schedule of values with detailed breakdown of costs per Division and include cash allowance items and contingency allowance items prior to the Pre-Construction Meeting for review and approval by the Owner and Consultant.

6. **LIST OF SUBMITTALS REQUIRED PRIOR TO FIRST PROGRESS DRAW**

Submit to the Consultant, the following:

6.1 Shop Drawing Schedule.

6.2 Permits as required for all Divisions.

6.3 Permits for temporary structures, including signs and as referenced elsewhere or as required by the Authorities.

6.4 Schedule of Values.

6.5 Estimate of monthly progress claims (cash flow schedule).

6.6 Construction Schedule.

END OF SECTION

1. **GENERAL**

1.1 Submit shop drawings and product data as requested under various Sections.

1.2 Do not proceed with work until relevant submissions are reviewed by the Consultant.

1.3 Present shop drawings, product data, samples and mock-ups in measurement units consistent with units represented on Drawings.

1.4 The Contractor's responsibility for errors and omissions in submission is not relieved by the Consultant's review of submissions.

1.5 Notify the Consultant, in writing at time of submission, identifying deviations from requirements of Tender Documents stating reasons for deviations.

1.6 The Contractor's responsibility for deviations in submission from requirements of the Contract Document is not relieved by the Consultant's review of submission, unless the Consultant gives written acceptance of specific deviations.

1.7 Make any changes in submissions, which the Consultant may require, consistent with the Contract Documents and resubmit as directed by the Consultant.

1.8 Notify the Consultant, in writing, when resubmitting, of any revisions other than those requested by the Consultant.

1.9 As part of their Scope of Work, the Consultant shall review shop drawings no more than twice. Should three or more reviews be required due to reasons of the Contractor omissions causing resubmission requests, then reimburse the Consultant for time expended in these extra reviews. Time shall be invoiced to the Contractor at rates recommended by the Consultants' professional association and disbursements shall be invoiced at the Consultant's cost. The Consultant will provide the Contractor with a fixed fee for review process. No work will proceed on these extra shop drawing reviews until such time as the Consultant receives a certified cheque for this service. Cover directly costs and administration associated with courier services and the like for these extra shop drawing reviews.

1.10 Submittals for items required to be sealed by a Professional Engineer (or as otherwise indicated as Engineered), shall be prepared under the design control and supervision of a qualified Professional Engineer registered in the Place of the Work. Design includes life safety, sizing of supports, anchors, framing, connections, spans, and as additionally required to meet or exceed requirements of applicable codes, standards, regulations, and authorities having jurisdiction.

2. **SUBMISSION REQUIREMENTS**

2.1 Coordinate submission of samples, mock-ups and relevant documentation with requirements of the Work and the Contract. Individual submissions will not be reviewed until related information is available.

2.2 Accompany submissions with transmittal letter, in duplicate, containing:

.1 Date.

.2 Project title and number.

.3 The Contractor's name, address, telephone and fax numbers, and contact name.

.4 Applicable specification section(s).

.5 Identification and quantity of each shop drawing, product data and sample.

.6 Other pertinent data.

2.3 After the Consultants' review, distribute copies.

3. **SHOP DRAWINGS/PRODUCT DATA**

3.1 Submit shop drawings on one reproducible transparency accompanied by three additional prints.

3.2 Lettering shall be not less than 3mm (1/8") high.

3.3 Check and sign each trade shop drawing and make notations considered necessary before submitting to the Consultant for review.

3.4 Drawings requiring no changes will be marked 'REVIEWED', and shall be submitted for As-Built Drawings purposes.

3.5 Drawings requiring several changes will be marked 'REVIEWED as NOTED' and shall be revised and submitted for As-Built Drawing purposes.

3.6 Drawings requiring substantial changes will be marked 'REVISE AND RE-SUBMIT' and shall be revised and resubmitted until Consultant stamps drawings with 'REVIEWED' or 'REVIEWED as NOTED'.

3.7 Manufacturers' catalogue cuts will be acceptable for non-custom items, providing that they are 213mm x 275mm (8 1/2" x 11") originals, and that they indicate choices including sizes, colours, model numbers, options and other pertinent data. Submissions showing only general information are not acceptable. Provide three copies of such material.

3.8 Shop drawing size shall be multiple of 213mm (8-1/2") and 275mm (11") excluding 38mm (1-1/2") binding margin and not larger than 838 x 1117mm (33" x 44"). Leave minimum 150 x 100mm (6" x 4") clear space for the Consultant's comments.

3.9 Upon completion of review by Consultant, shop drawing sepias will be returned to the Contractor for reproduction and issuance to trades concerned.

3.10 Retain one complete set of prints of reviewed shop drawings for the Owner. Prior to Substantial Performance of the Work, issue to the Owner in an acceptable, bound manner.

3.11 Keep copies of reviewed shop drawings on Site in a neat, orderly condition. Only copies marked with the Consultant's review stamp are permitted on the Site. Ensure that superseded documents are removed from site.

3.12 Shop drawings shall show:

.1 Fabrication and erection dimensions;

.2 Plans, sections, elevations, arrangements and sufficient full size details which indicate complete construction, components, methods of assembly as well as interconnections with other work;

3.13 Definition of the division of responsibilities between related trades and items shown on shop drawings, and with cross references to Drawings and Specifications;

3.14 Location and type of exposed anchors, attachments and locations and types of fasteners, including concealed reinforcements to accept mounted fasteners;

3.15 Adhesives, joinery methods and bonding agents;

3.16 Kinds and grades of materials, their characteristics relative to their purpose, detailed description of finishes and other fabrication information;

3.17 Configurations, types and sizes required; identify each unit type on drawing and on product;

3.18 Descriptive names of equipment and mechanical and electrical characteristics when applicable;

3.19 Data verifying that superimposed loads will not affect function, appearance and safety or Work shown on shop drawings, as well as other work interconnected;

3.20 Assumed design loadings, dimensions of elements and material specifications for load-bearing members;

3.21 Proposed chases, sleeves, cuts and holes in structural members;

3.22 Wall thicknesses of extrusions, shapes and dimensions.

3.23 Seal and signature of a Professional Engineer registered in the Place of the Work. The Professional Engineer, who seals the shop drawings, shall be covered by minimum $1,000,000 liability insurance. Submit proof of insurance when required.

3.24 Clearly indicate materials, gauges, and sizes being supplied and show connections, attachments, reinforcement, anchorage and locations of exposed fastenings. Refer to individual Sections for more particular requirements for shop drawings.

3.25 Welds: For structural welds use AWS symbols and clearly show net weld lengths and sizes.

3.26 Provide installation instructions and details for products to be installed by separate trades, including function of each part.

3.27 List of products shall be complete and show manufacturer's name, product name, generic description, Standard's certification where specified, manufacturer's complete installation data and precautions against wrong installation, operation and maintenance.

3.28 Shop drawing review by the Consultant is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that the Consultant approves detail design inherent in shop drawings, responsibility for which shall remain with the

Contractor and such review shall not relieve the Contractor of responsibility for meeting requirements of the Contract Documents. Contractor is responsible for dimensions to be confirmed and correlated at the Site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of the Work.

3.29 Do not reproduce, in any manner, portions of the Contract Documents either in whole or in part and submit such as part of the Contractor's shop drawing submission.

4. ADDITIONAL SHOP DRAWINGS

4.1 In addition to shop drawings requested in the Contract Documents, submit shop drawings of items as requested by the Consultant to ensure proper fabrication and installation of the Work.

4.2 In addition to shop drawings requested in the Contract Documents, submit shop drawings of hoardings, protective canopies, barricades, shoring and bracing, temporary offices, and other similar items to the Consultant, when directed.

5. SAMPLES

5.1 Provide relevant samples in context, at one time, in following groups, as requested by the Consultant, or as identified in each Section.

.1 Interior materials and finishes.
.2 Hardware.
.3 Mechanical fixtures and equipment.
.4 Electrical fixtures and equipment.

5.2 Deliver three samples to the Consultant's office with expenses, including carrying costs, prepaid, unless otherwise instructed.

5.3 Identify samples or assemblies by Project Number and Name, name of the Consultant, Contractor and Subcontractor and date of submission. Identify location, specified material reference and any other pertinent information. Show construction by layered method if necessary, clearly displaying textures and
patterns.

5.4 Materials used in the Work shall correspond to approved samples in every respect, including but not limited to texture, finish, colour and workmanship. One approved sample to be kept on Site.

5.5 Do not order materials until samples are accepted. Resubmit samples until acceptance is achieved.

5.6 Remove and replace materials or assemblies not matching approved samples, whether incorporated into Work or not.

6. MOCK-UPS

6.1 Mock-ups: means field or shop erected example of work complete with specified materials and workmanship.

6.2 Erect mock-ups at locations as specified and as acceptable to the Consultant. Do not proceed with work for which mock-ups are required prior to the Consultant's review of mock-ups.

6.3 Protect and maintain mock-ups until directed to remove. Commence work demonstrated in mock-up only after review and acceptance of workmanship. If possible, mock-up may become part of finished work, at sole discretion of the Consultant.

6.4 Reviewed and accepted mock-ups will become standards of workmanship and material against which installed work will be verified.

7. DEFICIENCIES

7.1 Upon completion of each wall assembly/Work area/unit, review the wall assemblies/Work area/units for deficiencies, based upon the standard of the mock-up wall assemblies/mock-up units, and prepare a list of outstanding deficiencies, forward the list to the Consultant and proceed with the correction of deficiencies noted.

7.2 Upon completion of the Contractor's deficiency list review the wall assemblies/project area/units and establish the completeness of the deficiency correction. Forward the 'checked

off' list to the Consultant accompanied by a written notification that wall assemblies/project area/units are ready for final review.

7.3 The Consultant will review these wall assemblies/project area/units for deficiencies, based upon the standards of the mock-up wall assemblies/mock-up units, prepare list(s) of deficiencies/outstanding work and forward copies to all parties.

7.4 Complete the work required by the deficiency list(s) expediently. Upon completion of the Consultant's deficiency list review the wall assemblies/project area/units and establish the completeness of the deficiency correction. Forward the 'checked off' list to the Consultant accompanied by a written notification that wall assemblies/project area/units are ready for additional review.

7.5 The Consultant may conduct additional review of the wall assemblies/project area/units to establish the completeness of the deficiency correction.

8. COORDINATION AND INTERFERENCE DRAWINGS

8.1 Prepare and submit coordination drawings and details for the Work regarding construction means and methods in order to achieve requirements of finished Work.

8.2 Prepare Coordination/Interference drawings for exposed conduit, mechanical piping/ducting and submit for review by the Consultant. Review by the Consultant may involve changes to proposed routing that increases the length of exposed items in order that they appear visually organized. Such changes shall not affect the Contract Price.

8.3 Distribute such drawings to affected parties prior to fabrication of components or ordering of products and materials.

8.4 Be responsible for means and methods of placement and construction in order to achieve compliance with the Contract in finished Work. Location of products and services is approximate unless specifically dimensioned and located on Drawings. Do not scale Drawings.

8.5 Pay costs associated with this work.

END OF SECTION

1. **LAWS, NOTICES, PERMITS AND FEES**

1.1 The Building Code - Ontario Regulation 350/06, including amendments, shall govern the construction of the Work.

1.2 Comply with Codes, By-Laws, and Regulations of the Authorities. Codes and regulations constitute an integral part of the Contract Documents.

1.3 The Owner shall apply and pay for Municipal Building Permit. Obtain and pay for other permits, licenses, deposits and certificates of inspection as part of the Contract Price.

1.4 Arrange for inspection, testing of the Work and acceptance required by the authorities. Be responsible for necessary preparations, provisions and pay costs.

2. **OVERLOADING**

2.1 Ensure that no part of the Work is subjected to a load endangering its safety or will cause permanent deformation. The Contractor will not, without prior written approval from the Landlord, impose upon any floor area a greater load than the designed live load capacity for the shopping center of 100 pounds per square foot uniformly distributed.

2.2 No suspended loads are permitted by the Landlord other than normal ceiling and lighting loads from the underside of any floor, roof or ceiling structure or assemblies of the shopping center without the prior approval of the Landlord. No suspended loads will be permitted from roofs, steel deck, ducts, pipes or conduits.

3. **FALSEWORK**

Design and construct falsework to CSA S269.1-1975.

4. **SCAFFOLDING**

Design and construct scaffolding to CSA S269.2-M87.

END OF SECTION

1. **REFERENCE STANDARDS**

1.1 Conform to referenced standards, in whole or in part, in their most recently revised or amended form, as specifically requested in the Contract Documents. If there is question as to whether a product or system is in conformance with applicable standards, the Consultant reserves the right to have such products or systems tested to prove or reject conformance.

1.2 Standards identified may be revised by the conditions of the Contract Documents, where the Contract Documents identify conditions constituting requirements beyond those identified in the related standard(s).

1.3 Conform to these standards, in whole or in part, in their most recently revised or amended form, as specifically requested in the Contract Documents.

1.3.1 AA - The Aluminum Association.
1.3.2 AAMA - Architectural Aluminum Manufacturers Association.
1.3.3 ACI - American Concrete Institute.
1.3.4 AISC - American Institute of Steel Construction.
1.3.5 AISI - American Iron and Steel Institute.
1.3.6 ANSI - American National Standards Institute.
1.3.7 ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers.
1.3.8 ASME - American Society of Mechanical Engineers.
1.3.9 ASTM - American Society for Testing and Materials.
1.3.10 AWCI - Association of the Wall and Ceiling Industries International.
1.3.11 AWI - Architectural Woodwork Institute.
1.3.12 AWMAC - Architectural Woodwork Manufacturers Association of Canada.
1.3.13 AWWA - American Water Works Association.
1.3.14 CASA - Canadian Automatic Sprinkler Association.
1.3.15 CGA - Canadian Gas Association.
1.3.16 CGSB - Canadian General Standards Board.
1.3.17 CISC - Canadian Institute of Steel Construction.
1.3.18 CITC - Canadian Institute of Timber Construction.
1.3.19 CPMA - Canadian Painting Manufacturers' Association.
1.3.20 CPCA - Canadian Painting Contractors' Association.
1.3.21 CRCA - Canadian Roofing Contractors Association.
1.3.22 CRSI - Canadian Reinforcing Steel Institute.
1.3.23 CSA - Canadian Standards Association.
1.3.24 CSPI - Corrugated Steel Pipe Institute.
1.3.25 CSSBI - Canadian Sheet Steel Building Institute.
1.3.26 C-UL-US - Underwriters Laboratories', with ULC and UL (classification or listing).
1.3.27 CWC - Canadian Wood Council.
1.3.28 EEMAC - Electrical and Electronic Manufacturers' Association of Canada.
1.3.29 Electrical Code - Ontario Hydro Electrical Safety Code.
1.3.30 FGMA - Flat Glass Marketing Association.
1.3.31 FMRC - Factory Mutual Research Corp.
1.3.32 HRAI - Heating, Refrigeration and Air Conditioning Institute of Canada.
1.3.33 IEEE - Institute of Electrical and Electronic Engineers.
1.3.34 IES - Illuminating Engineers Society.
1.3.35 IGMA - Insulating Glass Manufacturers' Alliance.
1.3.36 IPCEA - Insulated Power Cable Engineer Association.
1.3.37 MFMA - Maple Flooring Manufacturers Association.
1.3.38 MLA - Metal Lath Association.
1.3.39 MOEE - Ministry of Environment and Energy.
1.3.40 MTO - Ministry of Transportation, Ontario.
1.3.41 NAAMM - National Association of Architectural Metal Manufacturers.
1.3.42 NEMA - National Electrical Manufacturers Association.

1.3.43 NFPA - NATIONAL Fire Protection Association.
1.3.44 NHLA - National Hardwood Lumber Association.
1.3.45 NLGA - National Lumber Grades Authority.
1.3.46 NRC - National Research Council.
1.3.47 OBC - Ontario Building Code.
1.3.48 HO – Hydro One.
1.3.49 OPCA - Ontario Painting Contractors' Association.
1.3.50 OPSS - Ontario Provincial Standard Specification.
1.3.51 PCI - Prestressed Concrete Institute.
1.3.52 SCC - Standards Council of Canada.
1.3.53 SMACNA - Sheet Metal and Air Conditioning Contractors' National Association, Inc.
1.3.54 SSPC - Steel Structures Painting Council.
1.3.55 TSSA - Technical Standards & Safety Authority.
1.3.56 TTMAC - Terrazzo, Tile and Marble Association of Canada.
1.3.57 ULC - Underwriters' Laboratories of Canada (UL Canada.
1.3.58 UL - Underwriters' Laboratories, Inc.
1.3.59 WHI - Warnock Hersey International
1.3.60 WHMIS - Workplace Hazardous Materials Information System.

END OF SECTION

1. **QUALITY ASSURANCE INSPECTION AND TESTING**

Work will be subjected to quality assurance inspection and testing by qualified inspection and testing company, representing the Owner for the duration of the Contract. The inspection and testing company will operate under the direct supervision of the Consultant and will report directly to the Consultant. In no case shall the Contractor influence the decisions and operations of the inspection and testing company.

2. **RELATED REQUIREMENTS**

2.1 Allowances - Section 012100.

2.2 Product and Workmanship - Section 016000.

3. **INSPECTION AND TESTING**

3.1 During progress of the Work, quality assurance inspection and testing be performed to determine that the Work meets requirements of the Contract Documents. Allow full access and cooperate with inspection and testing company. Inspection and testing company will submit inspection and testing reports to the Owner, Consultant, and copy for the Contractor.

3.2 The Consultant will, on behalf of the Owner, appoint inspection and testing companies.

3.3 Cost of inspection and testing will be authorized as a disbursement from the Cash Allowance as specified in Section 012100. Inspection and Testing Consultant shall submit monthly invoice original to the Contractor for review, relating invoices to tests and inspection reports. Provide original receipts for disbursements. Invoices will be forwarded by the Contractor to the Consultant for inclusion in progress payment application.

3.4 Additional testing required because of changes in materials, proportions of mixes requested by the Contractor and Subcontractors as well as any extra testing of materials occasioned by lack of identification or by failure of such materials being replaced to meet Specification requirements or testing of structure or elements including load testing, shall be carried out at no addition to the Contract.

3.5 Inspection and tests required by codes or ordinances, or by an authority having jurisdiction, and made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

3.6 Inspection or testing performed exclusively for Contractor's convenience shall be sole responsibility of the Contractor.

3.7 Where factual evidence exists that defective workmanship has occurred or that the Work has been carried out incorporating defective materials, the Consultant reserves the right to have tests, inspections or surveys performed, analytical calculation of structural strength made and the like in order to help determine the extent of defect and whether the Work must be replaced. Tests, inspections or surveys carried out under these circumstances will be made at the Contractor's expense, regardless of their results, which may be such that, in the Consultant's opinion, the Work may be accepted.

4. **QUALITY ASSURANCE**

4.1 Inspectors for this Work shall be as recommended by the Consultant, subject to approval of the Owner.

4.2 Work of inspection and testing agency shall be performed by qualified and/or certified personnel under professional supervision or performed directly by a professional engineer qualified in conformance with applicable codes and certification programs.

4.3 Requirements of Regulatory Agencies:

4.3.1 Testing shall be conducted in accordance with requirements of the Building Code.

4.3.2 Obtain certification where required by applicable Codes and standards.

5. **CO-OPERATION WITH INSPECTION AND TESTING CONSULTANTS**

5.1 Provide access to the place of Work for representatives of inspection and testing companies.

5.2 Co-operate with inspection and testing consultants and give adequate notification of changes in source of supply, additional work shifts and any other proposed changes.

5.3 Products shall not be installed before they are tested when a test is specified, or shall work be executed where a test or inspection is required and the Inspector cannot attend.

5.4 Permit access for inspection to places where work is being done or material is stored prior to shipping.

5.5 Provide access to testing agency and supply necessary sampling materials for tests. Supply labour required to assist inspection and testing consultants in making tests.

5.6 Cost of above labour and material shall be borne by individual Subcontractors concerned.

5.7 The inspection and testing service does not relieve the Contractor and Subcontractor of responsibility for normal shop inspection, and quality control of production.

6. SCHEDULES FOR TESTING

Establishing Schedule:

.1 By advance discussion with the selected testing laboratory, determine the time required for the laboratory to perform its tests and to issue each of its findings.

.2 Provide required time within construction schedule.

Adherence to Schedule:

.1 Advise testing laboratory in advance when testing of Work is required.

.2 When testing laboratory is ready to test according to predetermined schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, extra costs for testing attributable to the delay may be back-charged to the Contractor and shall not be borne by the Owner.

7. REPORTS AND DOCUMENTS

7.1 Inspection and testing consultants shall submit shop inspection and Site inspection reports within five days of each inspection.

7.2 Distribute reports as follows:

.1 Owner; Three copies

.2 Consultant; One copy

.3 Contractor; Two copies

7.3 Inspectors shall provide a written report on each inspection or test, including pertinent data such as job site conditions, dates, test references, locations of tested materials, actual product identification, procedures and descriptions, site instructions given, recommendations and/or any other information required by standard applicable to reporting of tests and inspections.

7.4 Clearly indicate in report failure of products or procedures to meet applicable standards, give recommendations for retesting or correction. Contact the Consultant immediately when product or procedure fails to meet applicable standards.

8. INSPECTION AND TEST SPECIMENS

8.1 Specimens and samples for testing, unless otherwise provided in the Contract Documents, will be taken by the testing laboratory. The testing laboratory will provide sampling equipment and personnel; and will deliver specimens and samples to the testing laboratory.

8.2 Inspector takes samples necessary to verify quality as specified by applicable standards or as specified herein. Taking of samples shall not endanger the structure or life safety, and shall be taken so as to best represent the Work as a whole.

8.3 Samples shall be handled, packaged, stored and delivered so as to best ensure the validity of tests that will be performed on them. Sample handling where required shall duplicate site conditions.

9. SCHEDULE OF MATERIALS/SYSTEMS FOR INSPECTION AND TESTING

9.1 Refer to Specification Sections for specific inspection and testing requirements for the following list of materials/systems:

9.2 Roofing repairs inspection.

END OF SECTION

1. **GENERAL**

1.1 Arrange, obtain, and pay cost for permits required for temporary provisions.

1.2 Provide and maintain temporary provisions for the Work as long as required.

1.3 Arrange and pay for required temporary services.

1.4 **Permanent Services**

1.4.1 Do not use permanent conveying, mechanical (heating, ventilating) or electrical systems, except for standpipe for firefighting, during construction unless specific written permission is provided by the Consultant.

1.4.2 Use of permanent facilities for temporary construction service shall not prejudice warranties.

1.5 **Temporary Water Supply**

1.5.1 Provide potable water supply as required to carry out the Work.

1.5.2 Water charges shall be paid for by the Contractor.

1.6 **Temporary Electrical Services**

1.6.1 Provide and maintain an adequate temporary electrical service for operation of electric pumps, motors, vibrators and other power tools, hoisting and related construction and general illumination (162 Lux) during construction period.

1.6.2 Arrange and pay for power supplied for above service.

1.6.3 Provide and maintain components and equipment necessary to transform supply power to necessary temporary power voltage.

1.6.4 Provide illumination comparable to final illumination for final finishing work.

1.7 **Temporary Sanitary Facilities**

1.7.1 Provide and maintain, in compliance with applicable regulations, codes and by-laws, sanitary temporary water closets and washbasins for use of workers.

1.7.2 Use of building's new washroom facilities by workers is strictly prohibited.

1.8 **Temporary Heating and Ventilation**

1.8.1 Provide and pay for temporary heating, cooling and ventilating required for duration of the Contract period including attendance, maintenance and fuel, as required for continuous work as required to meet construction schedule.

1.8.2 Provide temporary heat and ventilation in enclosed areas as required to:

.1 Facilitate progress of work during full 12 months of the year.

.2 Protect work and products against dampness and cold.

.3 Prevent moisture condensation on surfaces.

.4 Provide ambient temperatures and humidity levels for proper storage, installation and curing of materials, in accordance with specified standards and manufacturer's requirements.

.5 Provide adequate ventilation to meet health regulations for safe working environment.

1.8.3 Keep premises heated to at least 13°C using approved temporary heating devices. Increase temperatures in isolated areas to 20°C as required by various trade Sections so stipulated.

1.8.4 Solid fuel salamanders will not be permitted.

1.8.5 Furnish other temporary heating as required by each Section, i.e. heating of materials, storage sheds and the like.

1.8.6 Ventilate work areas as required when toxic materials are being utilized or cured.

1.8.7 Replace with new, any work damaged due to failure to provide adequate heat at no cost to Owner.

1.9 **Temporary Enclosures**

1.9.1 Provide temporary weather tight enclosures for exterior openings in building to protect the Work from weather and vandalism.

1.9.2 Provide temporary weather tight enclosures for exterior openings and envelope for protection of existing building and finishes, until permanently enclosed.

1.9.3 Erect enclosures to allow access for installation of materials and working inside enclosure.

1.9.4 Design enclosures to withstand wind pressure.

1.9.5 Temporary enclosure shall be of finished appearance and painted to colour approved by the Owner and the Landlord.

1.10 **Temporary Telephone/Fax Machine**

1.10.1 Install and maintain a telephone and fax machine (no combo units) in the Contractor's Site office for exclusive use of the Consultants, Contractor and Subcontractors. Pay phone is not acceptable.

1.10.2 Fax machine shall be capable of recording date and time on faxes. Fax machines shall have dedicated telephone line.

1.10.3 Long distance charges shall be paid for by party making call.

1.11 **Plant, Machinery and Scaffolding**

1.11.1 Provide formwork, scaffolding, equipment, tools, and machinery and incidental appurtenances necessary for proper execution of Work.

1.11.2 Erect plant, machinery and scaffolding to permit access to the Work.

1.11.3 Construct and maintain scaffolds in rigid, secure and safe manner, in accordance with requirements of jurisdictional authorities, including CSA S269.1-1975(1998).

1.11.4 Support scaffolds from finished surfaces only after taking precautions to prevent damage. No supports, clips, brackets, or similar devices shall be welded, bolted, or otherwise affixed to any finished member or surface without prior permission. Remove anything so affixed prior to final finishing. Fill and finish resulting holes or voids.

1.12 **Site Storage**

1.12.1 Locate site storage facilities only where authorized by the Owner and the Landlord.

1.12.2 Handle and store materials so as to prevent damage to material, structure or Site and surrounding property.

1.13 **Protective Measures**

1.13.1 Erect protective measures such as, but not limited to, fencing, barricades, hoarding, notices, warning boards, lights and signals for safety of workers engaged in the Work, property, and public as required, and in accordance with authorities having jurisdiction.

1.13.2 Immediately following commencement of the Work, erect hoarding and protective measures as indicated in the Contract Documents.

1.13.3 Such protective measures shall be "neat and tidy" in appearance and finish painted, when visible to the public.

1.14 **First Aid**

Provide Health and Safety training and materials that are necessary to comply with requirements of the authorities.

1.15 **Protection of Work**

1.15.1 Take measures, including those required by authorities having jurisdiction, to provide protection for the Work at all stages of the operations, and maintain protection until the Work is completed.

1.15.2 Keep floors free of oils, grease or other materials likely to discolour them or affect bond of applied surfaces.

1.15.3 Remove and replace materials damaged as a result of failure to provide adequate protection.

1.16 **Fire Protection**

1.16.1 Take necessary precautions to eliminate fire hazards and to prevent damage to the Work, building materials, equipment and other property both public and private having to do with the Work.

1.16.2 Provide and maintain in working order, suitable labelled fire extinguishers and locate in prominent positions, to requirements of authorities having jurisdiction.

1.16.3 When welding, brazing and performing any operation with an open flame, keep a portable fire extinguisher within safe operating distance.

1.16.4 Store and locate materials and equipment packed in cardboard cartons, wood crates and other combustible containers in orderly and accessible manner. Place approved types of firefighting equipment in vicinity of materials or equipment packed in this type of crate or carton until permanent fire protection and equipment are available.

1.16.5 Store rags and waste containing oil, grease or other flammable materials in an approved fireproof cabinet or remove from Site, at end of each working day.

1.16.6 Burning of waste is not permitted on site.

1.17 **Fire Watch**

1.17.1 Obtain Hot Work Authorization from the Owner and the Landlord prior to Hot Work operation that may cause the building's fire alarm system to be activated or create an unwarranted fire risk condition. The prevention of fires and false fire alarms caused by these perilous operations are the primary goals of this procedure. Gas hoses, backflow preventers, fire resistive tarpaulins, curtains and other cutting and welding equipment must be in good repair before the permit is issued.

1.17.2 Hot Work is work using open flames or sources of heat that could ignite materials in the work area.

1.17.3 During and after welding or similar heat producing activities (Hot Work), monitor areas of work for the presence heat using suitable heat sensing equipment and qualified trained fire watch personnel. Fire Watch personnel shall be trained in the proper operation of first aid fire extinguishers. Comply with Owner's and the Landlord’s Fire Watch requirements, if unknown determine the Owner's and the Landlord’s requirements a minimum of 48 hours prior to required Hot Work activity.

1.17.4 Fire watch will be provided during and for at least 30 minutes after work, and during coffee or lunch breaks. Fire watch is supplied with suitable extinguishers, or charged small hose. Fire watch is trained in use of this equipment and in sounding alarm.

1.17.5 Necessary Precautions:

1.17.5.1 Precautions within 10m (35 ft.) of work:

.1 Floors swept clean of combustibles.

.2 Combustible floors wet down, covered with damp sand or fire-resistive sheets.

.3 3 Flammable liquids removed; other combustibles, if not removed protected with fire-resistive tarpaulins or metal shields.

.4 Explosive atmosphere in area eliminated.

.5 Wall and floor openings covered.

.6 Fire-resistive tarpaulins suspended beneath work.

1.17.5.2 Work on Walls or Ceilings:

.1 Construction is noncombustible and without combustible covering or isolation.

.2 Combustibles moved away from other side of wall.

1.17.5.3 Work on Enclosed Equipment:

.1 Enclosed equipment cleaned of all combustibles.

.2 Containers purged of flammable liquids.

1.17.6 Fire Watch Personnel may not do other jobs which detract from their primary responsibility.

1.17.7 Upon completion Hot Work activity, fire watch personnel shall sign a log sheet. Submit copy of log sheet at completion of each Hot Work activity. Return the work permit to the person who issued it within 30 minutes of job completion.

1.18 **Dust, Debris and Noise Control**

1.18.1 Keep premises free of waste material and construction debris.

1.18.2 Arrange and pay for removal of waste generated by the work in manner acceptable to authorities having jurisdiction.

1.18.3 Limit noise levels in accordance with requirements of authorities having jurisdiction.

1.18.4 Control dust and dirt produced during demolition to prevent dispersion beyond the immediate work areas.

1.18.5 Prevent abrasive-blasting and other extraneous materials from contaminating air beyond application area.

1.18.6 Install hoarding around the Place of Work in accordance with applicable standards, regulations and Landlord's requirements.

1.19 **Disposal of Wastes**

1.19.1 Do not bury rubbish and waste materials on site.

1.19.2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.19.3 Comply with waste disposal requirements of the Authorities.

1.20 **Traffic Control and Road Maintenance**

1.20.1 Do not block roads or impede traffic. Keep construction traffic to designated roads only. Provide flagmen to direct traffic as required.

1.20.2 Keep public and private roads free of dust, mud and debris resulting from truck, machinery and vehicular traffic related specifically to this Project, for the duration of the Work.

1.21 **Contractor's Site Office**

1.21.1 The Contractor shall make arrangements and get approval for the site office from the Owner and the Landlord.

1.21.2 Provide a minimum of five hard hats for use by visitors.

1.22 **Security**

1.22.1 Provide and maintain security lighting.

1.22.2 Provide and maintain temporary locks. Premises shall be locked after working hours. In case that the Site is left unattended during day it must be locked to prevent access by unauthorized persons

1.23 **Clean and Safe Access**

Remove excess materials and waste from areas and wash clean any soiling caused by the Work at all times.

1.24 **Vibration Control**

Contractor shall issue the following to the Owner for information and use:

1.24.1 The Contractor shall provide the Owner with a Schedule that shall outline the date, hours and duration of any construction practices and operation of equipment that will generate vibrations.

1.24.2 The Contractor shall provide the Owner with 48 hours notice for the time and duration for delivery of materials and equipment. Handling of material and equipment shall be done to prevent undue vibration.

1.24.3 For circumstances beyond the ability to schedule beforehand, the Contractor shall provide 24 hours notice to the Owner when vibrations will take place during the construction.

END OF SECTION

1. **GENERAL** NOT APPLICABLE

2. **PRODUCTS AND MATERIALS**

2.1 Materials used for temporary facilities may have been previously used, providing they are sound in structural qualities.

2.2 Specified Options: the Work is based on materials, Products and systems specified by manufacturer's catalogued trade names, references to standards (i.e. CAN, CGSB, CSA, ASTM), by prescriptive specifications and by performance specifications.

2.2.1 Where only one manufacturer's catalogued trade name is specified for a Product, the Product is single sourced and shall be supplied by the specified manufacturer.

2.2.2 Where more than one product or manufacturer is specified, select one product or manufacturer from the specified list and use for the duration of the Work.

2.2.3 When a Product is specified by reference to a standard, the Contractor may select any Product from any manufacturer that meets or exceeds the requirements of the standard.

2.2.4 When a Product or system is specified by prescriptive or performance specifications, the Contractor may provide any Product or system, which meets or exceeds the requirements of the prescriptive or performance specifications.

2.2.5 The onus is on the Contractor to prove compliance with governing published standards, prescriptive specifications and with performance specifications.

2.3 Products, materials, equipment and articles incorporated in the Work shall be new, not damaged or defective, and of best quality to the standards specified for the purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

2.4 Where the Specification requirements include design of a product or system, and minimum material requirements are specified, the design of such product or system shall employ materials specified within applicable Section. Where secondary materials or components are not specified, the Contractor shall augment materials to meet applicable Code limitations, and incorporate compatibility criteria with adjacent work.

2.5 Remove and replace defective products and be responsible for delays and expenses caused by rejection at no addition to the Contract.

2.6 Should any dispute arise as to quality or fitness of products, the decision rests strictly with the Consultant and shall be based upon the requirements of the Contract Documents.

2.7 Unless otherwise indicated in the Specifications, maintain uniformity of manufacturer for any like item, material, equipment or assembly for the duration of work.

2.8 Permanent labels, trademarks and nameplates on Products are not acceptable in prominent locations, except where required for operating instructions, or when located in Mechanical, Electrical, and Machinery or like Rooms.

2.9 The Owner retains right to select from all choices available within specified products for colours, patterns, finishes or other options normally made available. Submit full range of product options as per requirements of Section 013323 for Consultant's choice.

2.10 **Quality Control**

2.10.1 Provide a system of quality control to ensure compliance with the Contract Documents.

2.10.2 Notify the Consultant of any defects in the Work or departures from intent of the Contract Documents which may occur during construction. The Consultant will recommend appropriate corrective action in accordance with requirements of the Contract.

2.11 **Availability**

2.11.1 Immediately upon signing the Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are likely or possible, notify the Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of the Work.

2.11.2 Products that are specified by their proprietary names or by part or catalogue number form the basis of the Contract. No substitutes for these may be used without Consultant's acceptance in writing.

2.11.3 In the event of failure to notify the Consultant at commencement of the Work and should it subsequently appear that the Work may be delayed for such reason, The Consultant reserves the right to substitute more readily available products of similar character, at no increase in the Contract Price.

2.12 **Product Handling**

2.12.1 Handle and store products in a manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's and supplier's recommendations and so as to ensure preservation of their quality and fitness for the Work, and protect from vandalism and theft.

2.12.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seals and labels intact, facing to outside. Do not remove from packaging or bundling until required in the Work.

2.12.3 Store materials susceptible to environmental damage in a weather tight enclosure raised clear of ground so that they are protected from weather, dampness and deterioration. Do not use such materials which have been damaged by exposure to moisture.

2.12.4 Keep sand, when used as ingredients for grout, mortar or similar mixed materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

2.12.5 Store sheet materials, lumber and other products susceptible to deterioration on flat, solid supports and keep clear of slab.

2.12.6 Store and mix paints in a single designated, heated and ventilated room. Remove oily rags and other combustible debris from Site daily. Take every precaution necessary to prevent spontaneous combustion.

2.12.7 Carefully handle materials to preclude damaging existing surfaces and work of others.

2.12.8 Remove and replace damaged products.

2.13 **Transportation**

2.13.1 Pay cost of transportation of products required in performance of the Work.

2.13.2 Reject products damaged during transport.

2.13.3 Transportation of goods must be undertaken to suit project schedule. The Contractor is responsible for determining mode of transport to ensure delivery, obtaining shop drawings, placement of orders and on time premium costs, air freight et cetera,

3. **MANUFACTURER'S INSTRUCTIONS AND SITE ACCESS**

3.1 Unless otherwise indicated in the Specifications, install or erect products in accordance with manufacturer's printed instructions. Do not rely on labels or enclosures provided with products. Obtain printed instructions directly from manufacturers.

3.2 Notify the Consultant, in writing, of conflicts between the Specifications and manufacturer's instructions.

3.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Consultant to require removal and re-installation at no increase in the Contract Price.

3.4 Representatives of the manufacturer(s) shall have access to the Work at all times. The Contractor shall provide assistance and facilities for such access in order that the manufacturer(s) representative(s) may properly perform its function.

4. WORKMANSHIP

4.1 General

4.1.1 Execute work with workers experienced and skilled in the respective duties for which they are employed.

4.1.2 Do not employ an unfit person or anyone unskilled in their required duties.

4.1.3 Decisions as to the quality or fitness of workmanship in cases of dispute rest solely with the Consultant, whose decision is final.

4.2 Coordination

4.2.1 Ensure cooperation of workers in layout of the Work. Maintain efficient and continuous supervision.

4.2.2 Be responsible for coordination and placement of openings, sleeves and accessories.

4.3 Concealment

4.3.1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

4.3.2 Before installation, inform the Consultant of any contradictory situation. Install as directed by the Consultant.

4.4 Cutting and Remedial Work

4.4.1 Perform cutting and remedial work required to make parts of the Work come together. Coordinate the Work to ensure this requirement is maintained. Submit shop drawings showing proposed locations and sizes to the Consultant for review before commencing any cutting.

4.4.2 Qualified trades at the expense of party responsible shall correct cut Work.

4.4.3 Perform in a manner to neither damage nor endanger any portion of the Work.

4.4.4 Cut, patch and make good to leave the Work in a finished condition where new Work connects with existing and where the existing Work is altered.

4.4.5 Cutting, chasing and isolated demolition shall be responsibility of the Contractor who shall either perform these operations with their own forces under this Section of the Work, or in some cases as later set out, engage particular subcontractor responsible for material affected.

4.4.6 Where a Section corresponding to any part of the existing Work is not included in the Specifications, cutting and patching for such portions of the Work under this category shall be done under this Section.

4.4.7 Perform any type of work which may be required to make its several parts come together properly to fit into, receive, or be received by work of each trade shown upon, or reasonably implied by the Contract Documents, and make good after them as directed. Expense caused by omission of ill-timed work shall be borne by party responsible. Do not endanger any work by cutting, digging or otherwise altering, and do not cut or alter work of any separate contractor without written acceptance of the Consultant.

4.4.8 Drill carefully, leaving clean holes not larger than required.

4.4.9 Make cuts with clean, true, smooth edges. Fit units to tolerances established by existing work and in conformance with best standard practice for applicable class of Work.

4.4.10 Obtain acceptance from the Consultant for required cutting or drilling through structural elements.

4.5 Location of Fixtures

4.5.1 Consider location of fixtures, access panels, outlets and mechanical and electrical items indicated as approximate only. Locate fixtures, etc. approximately; Architectural Drawings will relate these items to known dimensions, eg. ceiling tile grid or wall locations et cetera. outlets, mechanical, and electrical items.

4.5.2 Obtain Consultant’s acceptance for precise locations of fixtures, access panels and outlets, mechanical and electrical items.

4.5.3 The Consultant reserves the right to relocate electrical outlets and mechanical fixtures at a later date, but prior to installation, without cost, assuming that the relocation per outlet does not exceed 3050mm (10') from the original location.

4.5.4 Inform the Consultant of conflicting installations. Install only as directed by the Consultant.

4.6 **Fastenings**

4.6.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

4.6.2 Prevent electrolytic action and corrosion between dissimilar metals and materials.

4.7 **Protection of the Work in Progress**

4.7.1 Take reasonable and necessary measures, including those required by the authorities, to provide protection.

4.7.2 Adequately protect the Work completed or in progress. The Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by the Consultant, at no increase in the Contract Price.

4.7.3 Prevent overloading of any part of the building. Do not cut, drill or sleeve any load bearing structural member without prior review by the Consultant, unless specifically indicated on Drawings.

4.7.4 . Adequately protect finished flooring from damage. Take special measures when moving heavy loads or equipment on them.

4.7.5 Keep floors free of oils, grease or other materials likely to discolour them or affect bond of applied surfaces.

4.7.6 Protect work of other Sections from damage while doing subsequent work. Damaged Work shall be made good by appropriate trade specialists but at expense of those causing damage.

4.7.7 .Protect existing buildings, curbs, roads and lanes. If, during Work, any buildings, curbs, roads or lanes are damaged, repair or replace them at no extra cost to the Owner.

4.8 **Existing Utilities**

4.8.1 When breaking into or connecting to existing services, execute the Work at times directed by the Landlord, with minimum disturbance to operation of existing building operations.

END OF SECTION

1. **GENERAL**

1.1 The procedure for completing the Contract and acceptance by the Consultant and the Owner shall be in accordance with the procedures described in the CCDC 2-2008, OAA/OGCA Document 100 and any additional requirements described below.

1.2 All stages will be reviewed at the first Coordination Site Meeting to ensure that all parties understand their responsibilities.

1.3 Within four weeks of commencement of work provide to the Consultant a list of all required Close-Out documents as required by the Contract Documents.

1.4 **Related Requirements**

1.4.1 Progressive Site cleaning - under Section 017413.

1.4.2 Execution and Closeout Requirements - under Section 017300.

1.4.3 Conditions of the Contract: Fiscal provisions, legal submittals, and other administrative requirements.

1.5 **Final Cleaning**

1.5.1 Immediately prior to approvals for Substantial Performance of the Work remove surplus products, tools, construction machinery and equipment not required for the performance of the remaining Work.

1.5.2 Remove waste products and debris other than that caused by the Owner, and leave the work clean and suitable for occupancy by the Owner.

1.5.3 When the Contract is completed, remove surplus products, tools, construction machinery and equipment. Remove waste products and debris.

1.5.4 Remove waste material and debris from the site at regularly scheduled times. Do not burn waste materials on site.

1.5.5 Make arrangements with and obtain permits from the Authorities for disposal of waste and debris. Pay all fees.

1.5.6 Leave the work thoroughly clean before date of Substantial Performance of the Work review process commences.

1.5.7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, and baked enamel, plastic laminate, mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

1.5.8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fittings, walls, and floors.

1.5.9 Vacuum clean and dust building interiors, behind grilles, louvres, and screens. Thoroughly vacuum clean interior of all electrical equipment.

1.5.10 Polish, seal, shampoo or prepare floor finishes, including existing, to recommendations of manufacturer.

1.5.11 Inspect finishes, fittings and equipment and ensure specified workmanship and operation.

1.5.12 Broom clean and wash exterior walks, steps and surfaces.

1.5.13 Remove dirt and other disfigurations from exterior surfaces.

1.5.14 Clean and sweep roofs, gutters, areaways, downspouts, and drainage systems.

1.5.15 Sweep and wash clean site paved areas.

1.5.16 Clean equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment.

1.5.17 Remove seal wrap on mechanical and electrical products and materials and clean as required.

1.6 **Certification of Substantial Performance**

1.6.1 The Certificate of Substantial Performance of the Work is to be prepared in form required by Construction Lien Act.

1.6.2 Submit approved shop drawings, operating instructions, as-built drawings, warranties and guarantees, maintenance materials and keys, two weeks prior to application for Certificate of Substantial Performance of the Work. Acceptance of the Work will be predicated on acceptance of submitted shop drawings, operating instructions, as-built drawings, warranties and guarantees, maintenance materials and keys.

1.7 **Deficiency Lists**

1.7.1 Neither the Owner's representatives nor the Consultant will be responsible for issue of extensive lists of deficiencies. Contractor assumes prime responsibility for ensuring that items shown on Drawings and described in Specifications are complete. Any reviews to approve the Certificates of Substantial Performance of the Work must be immediately cancelled if it becomes obvious that extensive deficiencies are outstanding.

1.7.2 Every effort shall be made to ensure that both defects and deficiencies are made good prior to final review.

1.7.3 During review, decision must be made as to which defects must be rectified before the building can be accepted and which defects are to be treated as warranty items.

1.7.4 Deficiencies shall be made good before the Contract is considered complete.

1.8 **System Demonstration and Project Commissioning**

1.8.1 Refer also to requirements of Mechanical and Electrical specifications with respect to commissioning.

1.8.2 Perform following work two weeks prior to application for the Certificate of Substantial Performance of the Work.

.1 Demonstrate operation of each system to the Owner and the Consultant.

.2 Instruct the Owner's personnel in operation, adjustment and maintenance of equipment and systems, using operation and maintenance data provided as the basis for instructions.

.3 The Contractor, manufacturer's representatives, and responsible personnel from Subcontractors whose work is being demonstrated shall be present at these demonstrations.

.4 Expedite and complete deficiencies and defects identified by the Consultant.

.5 Review maintenance manual contents (operating, maintenance instructions, as-built drawings, materials) for completeness. Review supply and completeness of spare parts required by the Contract Documents and manufacturers.

.6 Review cash allowances in relation to the Contract Price, change orders, holdbacks and other Contract Price adjustments.

.7 Submit required documentation such as statutory declarations, Workplace Safety & Insurance Board Certificate, warranties, certificates of approval or acceptance from authorities having jurisdiction.

.8 Attend 'end-of-work' testing and break-in or start-up demonstration.

.9 Review inspection and testing reports to verify conformance to intent of the Contract Documents and that changes, repairs or replacements have been completed.

.10 Meet with other consultants; structural, mechanical, electrical, to co-ordinate completion.

.11 Review condition of equipment such as elevators and heating system, which has been used in the course of the Work to ensure turning over at completion in "as new condition" with warranties dated and certified from time specified.

.12 Arrange and co-ordinate instruction of the Owner's staff in care, maintenance and operation of building systems and finishes by suppliers and Subcontractors.

1.8.3 When partial occupancy of uncompleted project is required by the Owner, co-ordinate Owner's uses, requirements, access, et cetera., with the Contractor's requirements to complete project.

1.8.4 Provide on-going review and attendance to building call-back, maintenance and repair problems during the warranty periods.

1.9 **Final Inspection for Completion of Contract**

1.9.1 When the Contractor is satisfied that the entire Work is completed, and after review, make written request for a final review by the Consultant, who in turn will notify the Owner.

1.9.2 If there are any further deficiencies determined by this review, they shall be listed by the Consultant and provided to the Contractor. This list shall be recognized as the final deficiency list for purposes of acceptance of the Work under the Contract.

1.9.3 Such deficiencies shall be corrected by a date mutually agreed upon between the Consultant, the Owner, and the Contractor, unless a specific date is required by the Contract, and a further review by the Consultant shall be called for by the Contractor following their own review to take place within seven calendar days from date of request.

1.9.4 The Contractor shall thereafter submit invoice for final payment.

1.9.5 Money shall be withheld for deficiency work and will be released only when all deficiencies have been completed. No partial payment to be recognized until all work is completed.

1.10 **Documents**

1.10.1 Collect reviewed submittals Section 013400 and assemble documents executed by Subcontractors, suppliers, and manufacturers.

1.10.2 Submit material prior to Application for Substantial Performance of the Work. For equipment put into use with Owner's permission during construction, submit within 10 days after start-up. For items of the Work delayed materially beyond date of Substantial Performance of the Work, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.10.3 Provide warranties fully executed.

1.10.4 Execute transition of Performance and Labour and Materials Payment Bond to warranty period requirements.

1.10.5 Submit a final statement of accounting giving total adjusted Contract Price, previous payments, and monies remaining at time of application for Completion of the Contract.

1.10.6 Consultant will issue a final change order reflecting approved adjustments to the Contract Price not previously made.

1.11 **Deficiency Review**

1.11.1 Provide a written request to the Consultant for deficiency review of the Work in accordance with Section 017000. Such request shall include a statement by Contractor that Work to be reviewed by Consultant for deficiencies is, to the best of their knowledge, in compliance with the Contract Documents, reviewed shop drawings, samples and that all previously instructed corrections by the Consultant have been corrected.

1.11.2 Provide to the Consultant a deficiency list of all items not completed or requiring rectification prior to the Consultant commencing their deficiency review.

1.11.3 Provide a schedule of planned deficiency review having regard to the foregoing.

1.12 **End of Warranty Period Inspection**

At the beginning of the twenty-four (24th) month after Substantial Performance of the Work in accordance with GC12.3, the Contractor and the Consultant, along with key subcontractors as designated, shall carry out a complete review of building and its systems to determine which deficiencies are to be rectified under the warranty. The Contractor shall be responsible for timely written notification to the Owner and the Consultant prior to such end of warranty period inspection and any delay in such notification shall extend such warranty period until proper notification is received by the Owner/Consultant.

1.13 **Declaration of Substantial Performance**

Within 14 days of Consultant's certification of Substantial Performance of the Work, provide the Consultant with exact copy of official certification as published in construction trade newspaper as required by the Construction Lien Act.

END OF SECTION

1. **As-Built Records**

1.1 Keep accurate record of 'as-built' conditions. Record any variations from the Work engineering, or shop drawings

1.2 Maintain drawings on one set and record accurately deviations from the Contract Documents as the Work progresses.

1.3 Mark changes in red ink.

1.4 Record, without being limited to the following:

1.4.1 Horizontal and vertical location of utilities and appurtenances referenced to permanent surface improvement

1.4.2 All other underground installations and services set beneath slabs-on-grade referenced to visible and accessible features of structure.

1.4.3 Field changes of dimensions/details.

1.4.4 Changes by Change Order/Supplemental Instructions/Change Directives.

1.4.5 Locations of interior mechanical and electrical equipment and distribution.

1.5 Before commencing any backfilling over service lines, confirm measurements and information to correct elevations and location depths of all services. Identify type and size of service and materials used.

1.6 Failure to maintain records on an ongoing basis will be considered grounds for withholding a portion of payments.

2. **Submittals**

2.1 Two sets of white prints of large Drawings will be supplied by the Consultant, for the Contractor to record 'as-built' information. During the course of the Work retain one set of white prints on Site (SITE SET) and one set off-Site (OFFICE SET). Prior to Substantial Performance of the Work application, neatly transfer markings from SITE SET to OFFICE SET and submit both to the Consultant for review.

2.2 Record 'as-built' conditions and substantiate to the Consultant on a monthly basis with progress draws that as-built records include current information.

2.3 Neatly transfer notations to sepias set and submit both sets to the Consultant for review to establish that all changes to the Work have been noted, two weeks prior to application for certificate of Substantial Performance of the Work and Consultant's review.

3. **Electronic Media**

3.1 Once hard copy of record drawings have been accepted by the Consultant, the Contractor shall receive electronic media in AutoCAD Release 12 or DXF format from the Consultant.

3.2 Contractor shall incorporate hard copy changes to the Drawings into the electronic media.

3.3 Provide two CD ROM copies of revised electronic media As-Built Record Drawings to the Owner prior to Substantial Performance of the Work.

4. **As-Built Drawings**

4.1 Provide drawings of adequate clarity, legibility, and uniformity of line thicknesses and size of lettering to ensure legible copies.

4.2 Drawings shall conform to following:

4.2.1 Drawing size shall be multiple of 213mm x 275mm (8-1/2"x11") excluding 32mm (1-1/4") binding margin, and overall size shall be not larger than 810mm x1080mm (32"x44").

4.2.2 Title block containing title 'AS-BUILT', date, the Contractor's name, address and telephone/fax numbers.

4.2.3 Provide graphic scale on drawings.

4.4.4 Lettering on drawings shall be the same size and not less than 3mm (1/8") high.

4.4.5 As-built Interface/Installation drawings for Mechanical/ Electrical Work shall meet above requirements and incorporate logo title requirements.

END OF SECTION

1. **MAINTENANCE MANUALS**

1.1 Before making application for Substantial Performance of the Work, submit to the Consultant three copies of Maintenance Manuals, consisting of shop drawings, warranties, and Project Data Book containing operating and maintenance data for supplied Products, in English, made up as follows:

1.1.1 Bind data in vinyl hard covered, three ring loose leaf binders for 213mm x 275mm (8-1/2 x 11") size paper.

1.1.2 Enclose title sheet, labeled as applicable, project name, date and list of contents.

1.1.3 Organize contents into applicable sections of work to parallel project specifications break-down. Mark each section by labeled tabs protected with celluloid covers fastened to hard paper dividing sheets.

1.2 For each shop drawing manual, submit one copy of accepted shop drawing complete with recorded changes made during fabrication and installation.

1.3 Provide a list of warranties and expiry dates.

1.4 Submit copies of guarantees, and warranties together in one report binder, with warranties submitted in standard form as provided and directed by the Consultant, including but not limited to:

1.4.1 Name and address of project.

1.4.2 Warranty commencement date (date of Substantial Performance of the Work).

1.4.3 Duration of Warranty is two years.

1.4.4 Clear indication of what is being warranted and what remedial action will be taken under warranty, including contact name and phone number for remedial work.

1.4.5 Authorized signature and seal of the Contractor, and of any Subcontractor providing materials of labour for portion of Work warranted.

1.5 Submit Project Data Book including following information plus date specified in other sections:

1.5.1 Maintenance instruction for finished surfaces and materials.

1.5.2 Copy of final hardware and paint schedules.

1.5.3 Description, operation and maintenance instructions for equipment and parts list. Indicate nameplate information such as make, size, capacity, serial number.

1.5.4 Names, addresses and phone numbers of sub-contractors and suppliers.

1.5.5 Additional material used in project listed under various Sections showing name of manufacturer and source of supply.

1.5.6 Charts, diagrams and reports identified in Divisions 23, 26 and 27 of the Specification.

1.5.7 Permits and Forms: Municipal Occupancy Permit; Statutory Declarations; Workplace Safety & Insurance Board Certificate; Certificates of Approval of the Work by local Building Department (if available) and Hydro authority Certificate of Inspection.

1.6 Neatly type lists and notes. Use clear drawings, diagrams of manufacturers' literature.

2. **MAINTENANCE MATERIALS**

2.1 Provide overage, extra stock and maintenance materials prior to application for Substantial Performance of Work. For required materials, see individual sections of Specification. Deliver to a location and at a time specified by the Owner, and as follows:

1.1 Use unbroken cartons, or if not supplied in cartons, material shall be strongly packaged.

2.2 Clearly mark cartons or packaging as to contents, project name, and supplier.

2.3 If applicable give colour and finish, room No. or area where material is used.

2.2 Replace incorrect or damaged maintenance materials delivered to Owner, including damage through shipment.

2.3 Provide a typed inventory list of maintenance materials prior to Substantial Performance of the Work application. List items, complete with quantities, and storage locations.

2.4 Establish a master list identifying maintenance materials and maintain a log of when materials are turned over to the Owner and signing authority for acceptance of materials on behalf of the Owner.

END OF SECTION

1. **ENVIRONMENTAL CONTROLS**

1.1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

1.2 Store volatile wastes in covered metal containers, and remove from premises daily.

1.3 Prevent accumulation of wastes which create hazardous conditions.

1.4 Comply with WHMIS labeling and material safety data sheet (MSDS's) requirements.

2. **MATERIALS**

2.1 Use only cleaning materials recommended by manufacturer of surface to be cleaned and as recommended by cleaning material manufacturer.

3. **CLEANING DURING CONSTRUCTION**

3.1 Maintain project, grounds and public properties free from accumulations of waste materials and rubbish.

3.2 Comply with the Landlord’s requirements.

3.3 Provide on-Site containers for collection of waste materials and construction debris.

3.4 Vacuum and clean interior building areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until Substantial Performance of the Work.

3.5 Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

Promptly, as the Work proceeds, on a daily basis and upon completion, clean up and remove debris, surplus materials and equipment.

4. **FINAL CLEANING**

4.1 In preparation for acceptance of the project on an interim of final basis perform final cleaning in accordance with requirements of Section 017000 Contract Closeout.

4.2 Contractor is responsible for cleaning of areas affected by the Work, including existing elements of Project and Project site.

4.3 Clean and polish finished flooring as part of final cleaning.

END OF SECTION

1. **GENERAL**

1.1 **General Instructions**

Read and be governed by conditions of the Contract and Sections of Division 1.

1.2 **Work Included in Section**

1.2.1 Various demolition and removals of existing and for provision of new work.

1.2.2 Restoration of damaged or disturbed Work.

1.2.3 Removal of surplus materials from the Site.

1.3 **Related Sections**

1.3.1 Making good of existing building components and finishes where affected by demolition and alteration work: under various respective trade Sections.

1.3.2 Temporary Facilities and Controls - under Section 015000.

1.4 **Qualifications**

Work of this Section shall be executed by a company having a minimum of five years continuous experience and able to deploy adequate equipment and skilled personnel to complete Work expediently in an efficient and orderly manner.

1.5 **Examination**

1.5.1 Examine existing property. Review existing site conditions thoroughly to establish full extent of items to be removed. Commencement of work will be considered to be acceptance of existing site conditions and removal of such items.

1.5.2 Examine adjacent properties. Determine extent of protection required.

1.6 **Reference Standards**

Comply with CSA S350-M1980 Code of Practice of Safety in Demolition of Structures.

1.7 **Maintaining Traffic**

1.7.1 Maintain and preserve existing access and egress. Provide 48 hours written notice of required interruptions.

1.7.2 Do not close, obstruct, place or store material in driveways and passages. Conduct operations with minimum interference with roads, streets, driveways and passages.

1.8 **Safety Requirements**

1.8.1 Undertake Work and effect arrangements required by authorities having jurisdiction for protection of public.

1.8.2 Post danger signs conspicuously around property. Close doorways and thoroughfares giving access to area of demolition with barricades.

1.8.3 Provide competent, experienced supervisor in charge of the Work and on Site while Work is in progress.

1.8.4 Stop work and notify promptly notify the Consultant if material resembling spray or trowel-applied asbestos, PCBs, or other non-identified designated substance be encountered in the course of demolition work. Do not proceed until written instructions have been received from the Consultant.

1.9 **Life and Fire Safety**

Provide fire extinguishers in acceptable locations to fire prevention authorities and of type suitable to enable personnel to cope with fire occurring during progress of Work.

1.10 **Protection**

1.10.1 Prevent movement, settlement or damage of adjacent parts of existing building to remain. Make good damage caused by demolition.

1.10.2 Protect work to remain against damage. Repair or replace damaged work at the discretion of the Consultant, at no cost to the Owner.

2. **PRODUCTS –** NOT APPLICABLE

3. EXECUTION

3.1 Demolition

3.1.1 Demolition to be coordinated with and performed where required for new Work as shown on architectural, mechanical, and electrical Drawings and as outline in related documents without exception.

3.1.2 Execute the Work in accordance with requirements of the authorities .

3.1.3 Dispose of materials not designated for salvage or re-use in the Work, including dumping costs.

3.1.4 Do not commence demolition work until occupants have permanently vacated demolition areas and materials and equipment not included in demolition work have been removed from demolition areas. Obtain Consultant's approval before commencing demolition.

3.1.5 At end of each day's work, leave the Site in a safe condition and erect safety barriers and lights as required. Ensure that no parts of existing structure are in danger of collapsing.

3.1.6 Control dust and dirt produced during demolition in accordance with requirements of authorities having jurisdiction.

3.1.7 Perform demolition with minimum noise. Pneumatic and other excessively noisy and disrupting tools, machinery and equipment will not be permitted without written consent of the Consultant.

3.1.8 Provide additional materials, labour and services required, not specifically mentioned or shown on Drawings, but necessary for proper completion of the Work.

3.1.9 Cap off existing services as indicated, in accordance with requirements of jurisdictional authorities or as indicated.

3.1.10 Selling, burning and burying materials on site are not permitted.

3.1.11 Leave building in a "broom-clean" condition on completion of work to the Consultant's satisfaction.

3.1.12 Clean existing surfaces specified to receive new applied finishes to assure proper adherence.

3.1.13 Clean existing surfaces to receive paint finish to paint manufacturer's written specifications and/or recommendations.

3.1.14 Confine operations and workers to those parts of the building which are defined on Drawings, and exercise great care not to damage existing construction beyond that necessary for the carrying out new work and make good any such damage in every respect.

3.1.15 Do not disturb adjacent items designated to remain in place.

3.2 Demolition within Existing Building

3.2.1 Do not cut structural elements, except in locations shown on Drawings, without the prior approval of the Consultant. For cutting other than that shown on Drawings, submit details to the Consultant.

3.2.2 Where saw cutting is not appropriate, use suitable hand tools.

3.2.3 Demolish, cut-out and remove from site all other work noted on Drawings or required to permit new construction.

3.3 Excessive Demolition

3.3.1 Where excessive demolition occurs, be responsible for cost of replacing such work.

3.3.2 The Consultant will determine extent of such "over-demolition" and method of rectification.

END OF SECTION

1. GENERAL

1.1 General Instructions

Read and be governed by Conditions of the Contract and Sections of Division 1.

1.2 Related Sections

1.2.1 Finish carpentry (general installations) - under Section 062023.
1.2.2 Architectural woodwork - under Section 064100.
1.2.3 Miscellaneous specialties - under Section 101000.
1.2.4 Washroom accessories - under Section 102800.

1.3 Source Quality Control

Identify lumber by grade stamp of an agency certified by Canadian Lumber Standards Administration Board.

1.4 Site Conditions

When it is required that wood maintain dimensional stability and tolerances to ensure accurate installation of later work, store and install it only in dry areas, and where no further installation of moist materials is contemplated.

2. PRODUCTS

2.1 Lumber Material

2.1.1 Except as indicated or specified otherwise lumber shall be softwood, S4S, moisture content (MC) not greater than 19 per cent at time of installation, in accordance with following standards:
.1 CAN/CSA 0141-91.
.2 NLGA Standard Grading Rules for Canadian Lumber.
2.1.2 Furring, blocking, nailing strips, grounds:
.1 Use S2S material.
.2 Board sizes: Spruce species, NLGA construction grade, S-DRY.
2.1.3 Curbs, cants, nailers for roofing: Spruce species, NLGA construction grade, sound and free of imperfections or deficiencies making unsuitable for use.

2.2 Panel Material

2.2.1 Plywood shall be of type, grade and thickness as specified in accordance with following standards:
2.2.1.1 Softwood plywood: to CSA 0151-M1978.
2.2.1.2 Douglas Fir plywood: to CSA 0121-M1978.

2.3 Wood Treatment

Wood Preservative Pressure Treatment: Wood shall be treated with CCA pressure treatment to CAN/CSA-080.

2.4 Fastenings and Hardware

2.4.1 Bolt, nut, washer, screw and pin type fasteners: with galvanized finish, to CAN/CSA G164-M92.
2.4.2 Use surface fastenings of following types, except where specific type is indicated.
.1 To hollow masonry, plaster and panel surfaces use 9mm (11/32") expansion bolts or other acceptable anchor.
.2 To solid masonry and concrete use expansion bolts.
.3 To structural steel use bolts through drilled hole, or welded stud-bolts or power driven self-drilling screws, or welded stud-bolts.

3. EXECUTION

3.1 General

3.1.1 Layout the Work carefully and to accommodate work of others. Cut and fit accurately. Erect in position indicated by Drawings. Align, level, square, plumb, and secure work permanently in place.

3.1.2 Bore holes true to line and to same size as bolts. Drive bolts into place for snug fit, and use plates or washers for bolt head and nut bearings. Turn up bolts and lag screws tightly when installed, and again just before concealed by other work or at completion of the Work.

3.1.3 Co-operate with work of other Sections to ensure that unity of actions will ensure orderly progress to meet construction schedule.

3.1.4 Include in the Work rough hardware such as nails, bolts, nuts, washers, screws, clips, and connectors required for installation of the Work; and operating hardware required in the Work of this Section for temporary use.

3.1.5 Do not attach the Work by wood plugs or blocking in concrete or masonry.

3.1.6 Do not regard nailers, blocking, and such other fastening provision as shown on Drawings as exact or complete. Install required provisions for fastening, located and secured to suit site conditions, and adequate for intended support.

3.1.7 Cut Work into lengths as long as practical and with square ends. Erect the Work plumb, in true planes, and fastened rigidly in place.

3.1.8 Verify that grounds required for fastening of components and equipment is located correctly, and that they provide adequate support.

3.1.9 19mm (3/4") plywood blocking as required to ensure proper anchorage and support required by the work of other trades.

3.2 **Roof Supports and Blocking**

Install curbs, supports and blocking as indicated on Drawings secured permanently to structure, trimmed and levelled to accommodate cambers, falls and insulation, and to receive flashings and applied roofing.

3.3 **Adjustment**

Ensure that bolted fasteners are drawn up tightly.

END OF SECTION

1. GENERAL

1.1 General Instructions

Read and be governed by Conditions of the Contract and Sections of Division 1.

1.2 General Requirements

1.2.1 Work of this Section includes installation of doors, frames, screens, and hardware and specified in other Sections.

1.2.2 This Section may be performed by one trade or at the discretion of the Contractor, by more than one trade.

1.3 Warranty

Warrant installation against defects and deficiencies for a period of two years from date of Substantial Performance of the Work.

2. PRODUCTS

2.1 Materials

2.1.1 Refer to the following Sections for products to be installed by the Work of this Section:

.1 Section 081100 - Steel Doors and Frames.

.2 Section 081400 - Wood Doors.

.3 Section 087100 - Finish Hardware.

3. EXECUTION

3.1 Examination

3.1.1 Provide necessary grounds, bracing and strapping for fitting and adequate for securing of the Work.

3.1.2 Co-operate with work of other Sections to ensure fastenings set by others are provided and located, their work is installed to their specifications and that those responsible for back priming are notified in sufficient time for them to schedule work.

3.2 Installation - General

3.2.1 Install the Work plumb, level and straight, and fasten it securely to backing to support it and anticipated superimposed loads.

3.2.2 Build the Work into construction as indicated on Drawings, or specified in other Sections of this Specification, or both.

3.2.3 Execute installation and assembly work on job, using skilled forces under supervision of a competent joinery foreperson.

3.2.4 Adequately fasten units and secure in place with concealed fixings wherever possible. Include grounds and furring where required.

3.2.5 Provide smooth surfaces with concealed fastenings.

3.3 Installation - Wood Doors

3.3.1 Install wood doors supplied under Work of Section 081400 after finishing of walls.

3.3.2 Fit wood doors with 2mm (0.079") clearance at jambs and heads, and 9.5mm (3/8") over finished flooring. Conform to label requirements for undercutting fire rated doors.

3.3.3 Trim hinge side of wood doors to fit, and bevel latch edges as required.

3.3.4 Ensure that top and bottom edges of wood doors are sealed under Work of Section after they are cut to fit.

3.3.5 Finishing: Sand wood surfaces of doors to be site finished, after installation to leave surfaces in true planes and free of machine or tool marks.

3.3.6 Install doors in accordance with manufacturer's instructions.

3.3.7 Install doors in accordance with AWI Quality Standards requirements.

3.3.8 Trim door width by cutting equally on both jamb edges.

3.3.9 Pilot drill screw and bolt holes.
3.3.10 Machine cut for hardware. Core for handsets and cylinders.
3.3.11 Coordinate and install continuous acoustic seal at base of acoustic doors.

3.4 **Installation - Metal Doors/Frames**

3.4.1 Set frames plumb, square, level and at correct elevation.
3.4.2 Install fire labelled frames in accordance with ANSI/NFPA 80 unless otherwise specified.
3.4.3 Brace frames rigidly in position while building-in. Install horizontal wood spreaders at third points of frame rebate to maintain frame width. Provide vertical support at centre of head for openings exceeding 1220mm (48") wide. Remove spreaders after frames have been built-in.
3.4.4 Make allowance for deflection to ensure structural loads are not transmitted to frames.
3.4.5 Adjust operable parts for correct clearances and function.
3.4.6 Install louvres, glazing and door silencers.

3.5 **Installation - Finishing Hardware**

3.5.1 Install finishing hardware supplied under Work of Section 087100.
3.5.2 Accurately locate and adjust hardware to meet manufacturer's instructions. Use special tools and jigs as recommended.
3.5.3 Locate door stops to contact doors 75 mm (3") from latch edge.
3.5.4 Prepare wood doors for installation with required bevels, clearances and mortises for hardware. Install wood doors and applicable hardware, including hinges.
3.5.5 Take delivery of finishing hardware and install, except hardware specified as part of work of another Section. Check each item as received.
3.5.6 Set, fit and adjust hardware according to manufacturer's directions, at heights later directed by Consultant. Hardware shall operate freely. Protect installed hardware from damage and paint spotting.
3.5.7 When installing hardware, carefully follow manufacturer's directions for installation of finish hardware.
3.5.8 Pre-drill kickplates and doors before attachment of plates. Apply with water-resistant adhesive and countersunk stainless steel screws.
3.5.9 Set thresholds on two continuous beads of polyurethane caulking fastened with a minimum of four countersunk screws.

3.6 **Adjustment and Cleaning**

3.6.1 Adjust doors to swing freely, smoothly and easily, to remain stationary at any point, to close evenly and tightly against stops without binding, and to latch positively when doors are closed with moderate force.
3.6.2 Adjust hardware so that latches and locks operate smoothly and without binding, and closers act positively with the least possible resistance in use. Lubricate hardware if required by supplier's instructions.
3.6.3 Ensure that doors equipped with closers operate to close doors firmly against anticipated wind and building air pressure, and to enable doors to be readily opened as suitable for function, location and traffic.
3.6.4 Clean hardware after installation in accordance with supplier's instructions.

END OF SECTION

1. **GENERAL**

1.1. **Related Work**

1.1.1 Rough carpentry - under Section 061000.
1.1.2 Finish carpentry - under Section 062023.
1.1.3 Joint sealants - under Section 079200.
1.1.4 Finish hardware - under Section 087100.
1.1.5 Glass and glazing - under Section 088100.
1.1.6 Painting - under Section 099100.

1.2 **Coordination**

1.2.1 Coordinate with other Contractors to ensure satisfactory and expeditious completion of the Work.
1.2.2 Take site dimensions relative to the Work. Perform the Work to suit site dimensions and conditions.
1.2.3 Provide forms, templates, anchors, sleeves, inserts and accessories required to be fixed to or inserted in the Work and set in place. Instruct applicable contractors as to their locations.
1.2.4 Be responsible for extra Work caused by, and time lost as result of failure to provide necessary cooperation, information or items to be fixed to or built in, in adequate time as determined by Project Schedule.
1.2.5 Coordination: Architectural woodwork specified under this Section includes woodwork items which are closely integrated with both prefinished and field painted architectural metalwork, stonework, glass, and built-in electrical components specified under separate Section, and consequently requires close coordination with such allied trades. This Section is responsible for ensuring correct installation procedures and results.

1.3 **Submittals**

1.3.1 Submittal review by the Consultant is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that the Consultant approves detail design inherent in submittals, responsibility for which shall remain with the Contractor and such review shall not relieve the Contractor of responsibility for meeting requirements of the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the Site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of the Work.
1.3.2 Product Data: Submit product data for each type of product and process specified in this section and incorporated into items of architectural woodwork.
1.3.3 Shop Drawings: submit one reproducible and one print of shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components. The reproducible will be returned.
.1 Include full scale drawings of all exposed-to-view edge conditions.
.2 Submit coordination drawings indicating locations of concealed grounds, cutouts, plates, and other required fabrications.
.3 Show relation to adjoining construction, details of outside and inside corners and door openings.
1.3.4 Selection Samples: Submit three sets of samples for initial selection purposes of actual veneers showing full range of grain variation, finish and patterns proposed for wood specified. Submit samples as many times as required until approved by the Consultant. First submission to include one set of samples as per the Consultant request plus one set lighter in tone and one set darker in tone.
.1 Solid wood with factory finish, and solid edge trim; set of three pieces, 51x19x450mm (2" x 3/4" x 18"), for each colour and finish, finished on one side and one edge.
.2 Veneered plywood panels, also including perforated wood panels, with solid edge trim with factory finish, three finished samples, 450mm (18") square, for each finish, four piece matched veneer cut and colour as specified.

.3 Casework hardware, one unit of each type and finish.

.4 Provide finished mock-up of hardwood veneer panels, 450 x 450 mm (18 x 18") size, complete with access door.

.5 Provide one wood frame corner mock-up, 450 x 450 mm (18 x 18") size.

1.4 **Quality Assurance**

1.4.1 Manufacturer/Fabricator: The Work of this Section shall be provided by a firm having a minimum of five years experience on projects of similar size and quality to that shown and specified.

1.4.2 Special Experience Requirements:

.1 Installer Qualifications: engage an installer who has successfully completed two architectural woodwork projects similar in scope, materials and design to this project within the last five years.

1.4.3 Single-Source Manufacturing and Installation responsibility: Engage a qualified Manufacturer to assume undivided responsibility for woodwork specified in this section, including fabrication, finishing, and installation.

1.4.4 Quality Standard: Comply with 2003 AWI/AWMAC - 8th Edition Quality Standards, except as otherwise indicated.

1.5 **Delivery, Storage and Handling**

1.5.1 Protect woodwork during transit, delivery, storage and handling to prevent damage, spoilage, and deterioration.

1.5.2 Do not deliver woodwork until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions".

1.6 **Project Conditions**

1.6.1 Environmental Conditions: Obtain and comply with Woodwork Manufacturer's advice for optimum temperature and humidity conditions for woodwork during its storage and installation. Do not install woodwork until these conditions have been attained.

1.6.2 Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimension of other construction by accurate field measurements before manufacturing woodwork; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of the Work.

1.7 **Coordination**

1.7.1 Coordinate the Work in this Section with other appropriate Sections of the specifications to ensure proper scheduling for fabrication and installation of the Work specified herein.

1.7.2 Coordinate with partition and finish sections of the specifications and other Contract Documents to ensure that proper provisions are made for the installation of the work specified herein.

1.7.3 Verify all dimensions in the field prior to fabrication of all architectural woodwork to assure proper fit.

1.7.4 Provide cut-outs, raceways, sleeves, grommets and other accessories which are required for coordination of work of other trades including, but not limited to, cables, conduits, and task lighting, as indicated.

1.8 **Warranty**

Provide written warranty to cover replacing and refinishing to make good any defects in architectural woodwork due to faulty workmanship of defective materials, which appear during a period of two years from date of Substantial Performance of the Work.

2 PRODUCTS

2.1 Materials

2.1.1 Provide materials that comply with requirements of the AWI/AWMAC woodworking standard for each type of woodwork and quality grade indicated and, where the following products are part of woodwork, with requirements of the referenced product standards, which apply to product characteristics indicated.

.1 Interior Wood Paneling, Millwork, Casework:

- Species for Transparent Finish: Cherry.
- Grade: Premium.
- Face Style: Flush, customized as per details.
- Frame Fabrication: Frameless, customized as per details.
- Grain Matching: Horizontal unless otherwise shown. No cathedrals and no pin holes larger than 0.75mm.
- Veneer Matching of Leaves: Slip Matched.
- Melamine: 19 mm thick, white, unless otherwise indicated, complete with matching non-yellowing edge trim.
- MDF: Medium density fibreboard, 19mm unless otherwise indicated.
- Plywood: Veneer core plywood, blank grade.
- Plastic laminate: GP grade, 1.2mm thick, colour as selected by Consultant and approved by owner.
- Types: (P.Lam-1): textured plastic laminate, colour as selected by Consultant and approved by owner or indicated on Drawings.

.2 Interior Wood Frames:

- Grade: Premium.
- Material: Cherry to match veneer.
- Joinery: Hidden dado, vertical frame member to appear to butt to horizontal member.

.3 Aluminum: Extruded aluminum alloy AA-6063-T5, clear anodized finish.

2.2 Basic Materials and Fabrication Methods

2.2.1 Hardwood and veneer to be selected by Consultant from 'General Woods and Veneers Ltd.'

2.2.2 General: Except as otherwise indicated, comply with following requirements for customized fabricated architectural woodwork.

2.2.3 Wood Moisture Content: Provide kiln-dried (KD) lumber with an average moisture content range of six per cent to 11 per cent for interior work. Maintain temperature and relative humidity during fabrication, storage and finishing operations so that moisture content values for woodwork at time of installation does not exceed five per cent to ten per cent.

2.2.4 Fabricate woodwork to dimensions, profiles, and details indicated with openings and mortises precut, where possible, to receive hardware and other items of work.

2.2.5 Ease edges to a 1/16" (1.5mm) radius at countertops.

2.2.6 Complete fabrication, assembly, finishing, hardware application, and other work before shipment to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary, provide ample allowance for scribing, trimming, and fitting.

2.2.7 Pre-Cut Openings: Provide woodwork, solid tops and other indicated materials with pre-cut openings, where possible, for hardware, appliances, plumbing fixtures, electrical work, telephone cut-outs and similar items. Locate openings accurately and provide proper size and shape. Smooth edges of cutouts and, where located in countertops, seal edges of cutouts with a water-resistant coating.

2.2.8 Measurements: Before fabrication of woodwork to be fitted to other construction, obtain field measurements and verify dimensions and shop drawing details as required for accurate fit.

2.2.9 Lumber: AWI/AWMAC with the following requirements;

.1 Hardwood for Concealed Blocking and Framing: Economy grade, any species which when painted, will not show any defects.

.2 Hardwood for exposed blocking: to be Cherry, grade to match panel veneer.

2.2.10 Miscellaneous Products:

.1 Fasteners:

- Wood Screws: FS FF-S-111, type, size, material and finish as required for the condition of use.
- Nails: FS FF-N-105, type, size material and finish as required for the condition of use.
- Anchors: Type, size material and finish as required for the condition of use.
- Staples: Type, size, to provide sufficient strength to hold upholstered fabric taut and in place without sagging.
- All fastening devices shall be set or countersunk flush with surface of framing member. No exposed fasteners. Where accepted by Consultant, exposed fasteners shall be flat head hex socket cap screws and matching joint connector sex bolts by Murakoshi; finish selected by Consultant.
- At butt joints in railing caps and counter surfaces, employ assembling bolts to ensure tight structural joint, acceptable product: part number 516-2G
- Concealed panel hanging strips: extruded aluminum interlocking strips. Strips and fasteners/anchors to be capable of supporting 2.5 times dead load of panels in both vertical and horizontal panel applications.

2.2.11 Adhesives:

.1 For All Other Uses: Moisture resistant complying with FS MMM-A-125, Type II, or MMM-A-188, Type I, II or III; type best suited for the purpose.

.2 All adhesives shall meet (MSDS) Material Safety Data Sheet Standards.

2.2.12 Veneer grade: AWI/AWMAC AA Grade.

2.2.13 Solid hardwood: AWI/AWMAC Grade I, without mineral stains.

2.2.14 Casework Hardware: Cabinet hardware shall be furnished and installed by the architectural woodwork manufacturer.

.1 Hardware to be Richelieu (distributor Tel: 1-800-361-6000) as follows:

- Straight rod pull on pins: 219 mm long, Richelieu No. 3478.219, #170 stainless steel finish.
- Straight rod pull on pins: 562mm long, Richelieu No. 3478.562, #170 stainless steel finish.

.2 Pull: D-type pull, 96 mm long, Richelieu No. 33205, #195 brushed nickel finish.

2.3 **Fabrication - General**

2.3.1 General: Provide architectural woodwork visible from any one space or room fabricated from a single flitch obtained from the same tree, and shall match in cut grain, colour, finish, and other aesthetic effects.

2.3.2 Provide steel framing and lumber framing for architectural woodwork, complete with all bracing and fastening devices as required for a rigid installation, and as required to sustain the imposed loads.

2.3.3 Do all fabrication from field measurement with provision for scribing as required to meet built-in conditions.

2.3.4 Coordinate the work of this Section with the work of other trades.

2.3.5 Fabricate units in largest practicable sections. Trial fit them in the shop, disassemble for shipment and reassemble with concealed fasteners.

2.3.6 Maintain relative humidity and temperature during fabrication, storage and finishing operations matching that of the areas of installation.

2.3.7 Reinforcing shown is minimum. Provide additional reinforcing as required to ensure

a rigid assembly. Exposed surfaces shall be free from dents, tool marks, warpage, buckle, glue and open joints, or other defects. Accurately fit all joints, corners and miters.

2.3.8 Provide openings for hardware, appliances, plumbing fixtures and electrical work. Locate openings accurately and use templates or diagrams for proper size and shape. Smooth edges of cutoffs and seal edges of cutouts in countertops with a water-resistant coating.

2.3.9 Provide balancing sheets as required, and specified, complying with referenced AWI standards.

2.4 **Factory Finishing of Interior Architectural Woodwork**

2.4.1 Quality Standard: Comply with AWI/AWMAC unless otherwise indicated.

2.4.2 General: The entire finish of interior architectural woodwork is specified in this section, regardless of whether factory applied or applied after installation.

2.4.3 Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces and similar preparations for finishing of architectural woodwork, as applicable to each unit of work.

2.4.4 Transparent Finish for Open-Grain Woods: Comply with requirements indicated below for grade, finish system, staining, effect, and sheen.

.1 Grade: Premium.

.2 Sheen: Satin.

.3 AWI/AWMAC Finish System TR-2 - Lacquer (Catalyzed), Premium Grade.

3 EXECUTION

3.1 **Preparation**

3.1.1 Condition woodwork to average prevailing humidity conditions in installation areas before installing.

3.1.2 Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.

3.1.3 Provide all grounds, nailers and other required fabrications which are to be built into other work when required.

3.2 **Installation**

3.2.1 Quality Standard: Install woodwork to comply with AWI/AWMAC for same grade specified in Part 2 of this section for type of woodwork involved.

3.2.2 Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 3mm (1/8) inch in 2.4m (8'-0") for plumb and level (including tops) and with no variations in flushness of adjoining surfaces.

3.2.3 Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

3.2.4 Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fastener heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with wood work and matching final finish where transparent finish is indicated.

3.2.5 Complete the finishing work specified in this section to whatever extent not completed at shop or before installation of woodwork.

3.3 **Adjustment and Cleaning**

3.3.1 Repair damaged and defective woodwork where possible to eliminate defects functionally and visually; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

3.3.2 Clean, lubricate, and adjust hardware.

3.3.3 Clean woodwork on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.3.4 Protect architectural woodwork during remainder of construction period to ensure that work will be without damage or deterioration at time of acceptance.

3.4 **Protection**

Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensures that woodwork is without damage or deterioration at time of the Substantial Completion.

END OF SECTION

1. GENERAL

1.1 General Instructions

Read and be governed by the Contract and Sections of Division 1.

1.2 General Requirements

1.2.1 This Section governs firestopping systems installed by trades throughout the Work.

1.2.2 This Section may be performed by one Sub-contractor or at the discretion of the Contractor, by more than one Sub- contractor.

1.3 System Description

1.3.1 Work of this Section comprises firestopping materials and/or systems to provide closures to fire at openings around penetrations, at unpenetrated openings, at projecting or recessed items, and at openings and joints within fire separations and assemblies having a fire-resistance rating, including openings and spaces at perimeter edge conditions.

1.3.2 Work of this Section also comprises smoke sealants applied over firestopping materials or combination smoke seal/firestop seal material to form air tight barriers to retard the passage of gas and smoke.

1.3.3 The installed firestopping/smoke sealant system shall provide and maintain a fire-resistance rating equivalent to the rating of the adjacent floor, wall or other fire separation assembly to the requirements of, and as acceptable to, the authorities having jurisdiction and to the Consultant.

1.3.4 Firestopping and smoke seals within mechanical (i.e. inside ducts, dampers) and electrical assemblies (i.e. inside electrical busducts if applicable) shall be provided as part of the Work of Divisions 21, 22, 23, 26 and 27 respectively. Firestopping and smoke seals around the outside of such mechanical and electrical assemblies where they penetrate fire-rated separations shall be part of the Work of this Section unless otherwise indicated by the Contractor.

1.4 Related Sections

1.4.1 Sealing around service penetrations through non-fire rated floors and walls - under Divisions 21, 22, 23, 26 and 27.

1.4.2 Sealing of openings and perimeter spaces at non-fire rated walls and floor slabs not penetrated by services, unless otherwise specified herein - under Section .

1.4.3 Setting of duct flanges and other similar mechanical supporting devices into beads of firestop sealant - under Division 23.

1.4.4 Electrical conduit - Division 26.

1.4.5 Firestopping requirements for Mechanical and Electrical Penetrations - under Divisions 21, 22, 23 and 26.

1.5 Quality Assurance

1.5.1 Provide experienced and competent installers, trained by material or system manufacturer.

1.5.2 Applicator Qualifications:

.1 Applicator shall have at least three years experience in installing materials of types specified and shall have successfully completed at least three projects of similar scope and complexity.

.2 Applicator shall designate a single individual as project foreperson who shall be on site at all times during installation.

1.5.3 Single source responsibility for firestopping materials:

.1 Obtain firestop materials from single manufacturer for each different product required.

.2 Manufacturer shall instruct applicator in procedures for each material.

1.5.4 Regulatory Requirements:

.1 Firestop System installation must meet requirements of CAN/ULC-S115-95 tested assemblies that provide a fire rating equal to that of construction being penetrated.

.2 Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.

1.6 **Submittals**

1.6.1 Shop Drawings:

.1 Submit drawings indicating the fire resistance rated assembly number, the required temperature, hose stream, and flame rating, material thicknesses, installation methods and materials of firestopping and smoke seals, primers, supports, damming materials as applicable, reinforcements, anchorages, fastenings and methods of installation for each condition to be encountered.

.2 Designate on shop drawings both fixed and moving penetrants, relative positions, expansion and control joints in rated slabs and walls, firestopping details at receptacles and similar poke-through devices and surrounding permanent materials. Identify re-entry locations.

.3 Manufacturer's Product Data: Submit data for materials and prefabricated devices, providing descriptions sufficient for identification on Site.

.4 Certificates: Submit manufacturer's certification that installed firestopping and smoke seal materials comply with specified requirements.

.5 Fire resistance rating listings: Submit copies of listing cards for review.

1.6.2 Samples: Submit only as requested various types of firestopping and smoke seal material.

1.7 **Delivery, Storage and Handling**

1.7.1 Deliver the materials to the job site in the manufacturer's unopened containers, containing the classification label, with labels intact and legible at time of use.

1.7.2 Store materials in accord with manufacturer's recommendations with proper precautions to ensure fitness of material when installed.

1.7.3 Comply with pertinent provisions of Sections 015000 and 016000.

1.7.4 Before handling, read product data sheets and material safety data sheets. Do not use damaged or expired materials.

2. **PRODUCTS**

2.1 **Acceptable Manufacturers/Installation Specialists**

2.1.1 General: Manufacturers of firestopping products and installation specialists for this Work are limited to applicable assemblies as required for Project and having ULC or C-UL-US or Warnock Hersey labelled packaging.

2.1.2 Approved manufacturers:

.1 3M Canada.

.2 A/D Fire Protection Systems Inc.

.3 Hilti.

.4 Tremco, Inc.

2.2 **Materials**

2.2.1 Firestopping and smoke seals shall conform to the following:

.1 Asbestos-free materials and systems;

.2 Provide a fire-resistance rating not less than the fire-resistance rating of the surrounding or adjacent floor, wall or other assembly;

.3 FTH Rated and certified in accordance with CAN/ULC-S115-95, and be labelled (WH, cUL, ULC).

2.2.2 Products shall be compatible with abutting dissimilar architectural coatings and finishes at floors, walls, ceilings, waterproofing membranes and the like. Check with

requirement of Contract Documents and manufacturer of selected materials being installed.

3. EXECUTION

3.1 Manufacturer's Instructions

Compliance: Comply with manufacturer's product data including product technical bulletins, product catalogue installation instructions and product packaging instructions.

3.2 Preparation

3.2.1 Examine sizes, anticipated movement and conditions to establish correct thickness and installation of back-up materials.

3.2.2 Clean bonding surfaces to remove deleterious substances including dust, paint, rust, oil, grease, moisture, frost and other foreign matter which may otherwise impair effective bonding.

3.2.3 Remove insulation from insulated pipe and duct where such pipes or ducts penetrate a fire separation unless listed assembly permits such insulation to remain within the assembly, or where mechanical trades have installed special fire rated insulated sleeves.

3.2.4 Prepare surfaces, prime, mask adjacent surfaces and clean in accordance with manufacturer's directions and to requirements of tested assembly.

3.3 Installation

3.3.1 Mix and apply firestopping, gas and smoke seals in strict accordance with manufacturer's instructions and tested designs to provide required flame rated seal, to prevent the passage of gas and smoke, and where specifically designated, the passage of fluids.

3.3.2 Provide temporary forming and packing as required. Apply materials with sufficient pressure to properly fill and consolidate the mass to seal openings.

3.3.3 Tool or trowel exposed surfaces.

3.3.4 Notify the Consultant when random completed installations are ready for review, as directed by Consultant, prior to concealing or enclosing firestopping and as applicable, smoke seals.

3.4 Clean Up

Remove excess materials and debris and clean adjacent surfaces immediately after application. Remove and or correct staining and discolouring of adjacent surfaces as directed.

END OF SECTION

1. GENERAL

1.1 General Instructions

Read and be governed by the Contract and Sections of Division 1.

1.2 Related Sections

1.2.1 Architectural woodwork - under Section 064100.

1.2.2 Firestopping - under Section 078400.

1.2.3 Gypsum board and acoustic sealant - under Section 092116.

1.2.4 Ceramic tile - under Section 093013.

1.3 Quality Assurance

Execute Work of this Section using an applicator that has adequate plant, equipment and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past five years.

1.4 Submittals

1.4.1 Submit manufacturer's product name and data sheets for sealants, primer, and cleaners which will be used for Project, before commencing the Work.

1.4.2 Test sealant in contact with samples of materials to be caulked to ensure that proper adhesion will be obtained and no staining of the material will result. Prepare sample joints at the site of each type of sealant for each joint condition. Do not proceed with Work until each mock-up joint has been accepted.

1.4.3 Provide 2440mm (96") long sealant joint mock-up for review prior to commencement of work in accordance with Section 013400. Accepted joint will establish minimum acceptable quality of workmanship and will serve as the standard by which subsequent Work will be compared for acceptance.

1.4.4 Submit sealant colour samples at each sealant product and colour, in accordance with Section 013400.

1.5 Environmental Conditions

Sealant and substrate materials: Conform to sealant manufacturer's specifications and recommendations. Keep sealant materials heated to at least 16°C when working at temperatures below 10°C.

1.6 Warranty

Warrant labour, materials and workmanship against defects and deficiencies for a period of two years from date of Substantial Performance of the Work.

2. PRODUCTS

2.1 Materials

2.1.1 Materials utilized in a sealant system shall be compatible.

2.1.2 Sealant backing:

.1 Compatible with primers and sealants, outsized 30 to 50 per cent.

.2 Polyethylene, urethane, neoprene or vinyl: extruded closed cell foam, Shore A hardness 20, tensile strength 830 to 900 kPa and manufactured especially for the purpose.

2.1.3 Primers: specifically designed for use with sealant on surfaces encountered, and as specified by the sealant manufacturer to assure adhesion of sealant and to prevent staining of substrate materials.

2.1.4 Sealants:

.1 Sealant colours: selected by Consultant from manufacturer's standard range, to match adjacent materials.

2.1.5 Exterior sealants:

.1 Silicone sealant: One Component Elastomeric Chemical Curing CAN/CGSB-19.13-M87, low modulus. Acceptable product: Tremco, Inc. 'Spectrem 3'.

2.1.6 Interior sealant: Paintable acrylic latex to CAN/CGSB-19.17-M90. Acceptable manufacturers: Tremco, Inc. "834", Sika "Sikaflex 1A".

2.1.7 Interior mildew resistant one part silicone sealant: CAN/CGSB-19.22-M89, and meeting FDA regulation 21 CFR 117.2600; acceptable products:

2.1.8 "Dow Corning 786"; Dow Corning Corp.

2.1.9 “SCS 1702 Sanitary"; General Electric Co.

3. EXECUTION

3.1 Supervision

Unless specified otherwise herein comply with the recommendations and directions of the manufacturer whose materials are being used on the Work.

3.2 Preparation

3.2.1 Clean contact surfaces of joints and spaces to be sealed in strict accordance with manufacturer's instructions.

3.2.2 Ensure that surfaces are structurally sound, cured, and dry. Remove frost, ice, dust, grease, loose mortar, other contaminants or laitance which adversely affect the adhesion of the sealing materials.

3.2.3 Clean ferrous metals of rust, mill scale and foreign materials by wire brushing, grinding or sanding.

3.2.4 Wipe metal surfaces to be sealed, except precoated metals, with cellulose sponges or clean rags soaked with cleaning material, and wipe dry with clean cloth. Where application temperature is less than -7°C, use MEK. Clean precoated metals with solutions or compounds which will not injure finish and which are compatible with primer and sealant.

3.2.5 Test materials for indications of staining or poor adhesion before any sealing is commenced. Submit reports in writing to Consultant of results.

3.2.6 Do not apply sealants to damp or contaminated surfaces.

3.3 Masking

Where necessary to prevent contamination or marring surfaces of adjacent materials, mask areas adjacent to joints with masking tape prior to priming or sealing application. Remove tape immediately after joint has been completed and an initial set achieved.

3.4 Mixing

3.4.1 Adhere to manufacturer's printed directions for mixing, work life, and all characteristics of sealant to be used.

3.4.2 Mix materials using equipment recommended by manufacturer.

3.5 Installation

3.5.1 Read other Sections of Specifications for extent of sealants prescribed by those Sections. Do other sealant work specified or required.

3.5.2 Do not thin or adulterate sealant.

3.5.3 When surfaces of adjacent materials are to be painted, do sealant work before these surfaces are painted, except where silicone sealants are required.

3.5.4 Check to make sure shop paint is compatible with primer and sealant. When incompatible, inform Consultant and change primer and sealant to compatible type acceptable to Consultant.

3.5.5 Check form release agent used on concrete for compatibility with primer and sealant. If they are incompatible inform Consultant and change primer and sealant to compatible type, or clean concrete to sealant manufacturer's acceptance.

3.5.6 Prime surfaces to receive sealants as required by manufacturer's specifications to ensure positive and permanent adhesion, and to prevent staining.

3.5.7 Pack joints tightly with sealant backing set at depth specified for sealant. Fill other voids with filler.

3.5.8 Install bond breaker tape in bottom of joints in lieu of sealant backing where proper depth cannot be obtained when backing is installed.

3.5.9 Maintain correct sealant depth. Sealant depth shall be 1/2 the width of the joint, maximum depth shall be 12.7mm (1/2"), minimum depth shall be 6mm (1/4"). Comply with manufacturer's written recommendations.

3.5.10 Fillet bead sealant joints to be sized to provide proper contact area with substrates, in accordance with manufacturer's written recommendations.

3.5.11 Apply sealants using pressure-operated guns fitted with suitable nozzles in accordance with manufacturer's directions. Apply sealants in such manner as to ensure good adhesion to sides of joints and to completely fill voids in joints.

3.5.12 Apply sealants so that surfaces of joints are smooth,, full bead, free from ridges wrinkles, sags, air pockets and embedded impurities. Tool sealant surfaces to produce a smooth surface.

3.5.13 Remove droppings and excess sealant as Work progresses, before material achieves initial set.

3.5.14 Install sealant materials and primers when surfaces are prepared and ambient temperature and weather conditions are prevalent, consistent with manufacturer's recommendations.

3.6 Cleaning

3.6.1 Clean adjacent surfaces which have been soiled or otherwise marred, in an approved manner, to completely remove evidence of misplaced material.

3.6.2 Remove masking tape, soils and sealant which may have been deposited on surfaces near joint.

3.7 Exterior Sealant Schedule

3.7.1 Include in Work of this Section, sealants, except where specified under the Work of other Sections, to seal open joints in surfaces exposed to view, and to make the building weather tight and airtight, as applicable, as indicated typically on Drawings and as otherwise specified.

3.7.2 Exterior sealant work shall be performed by this Section. Install exterior sealant to:

.1 Perimeters of exterior openings where frames meet exterior facade of building.

.2 Exterior exhaust louvres. Provide space in sealant at bottom for drainage.

3.8 Interior Sealant Schedule

3.8.1 Install interior sealant to:

.1 Movement and control joints on exposed insitu concrete walls.

.2 Interior control and expansion joints in floor and wall surfaces.

.3 Perimeters of exterior door and window frames, for air seal.
.4 Perimeters of interior door, screens and window frames.
.5 Install mildew-resistant sealant to:
.6 Perimeter joints of washroom fixtures such as urinals, water closets.
.7 Perimeter of bath fixtures such as sinks, and trim.
.8 Ceramic tile joints, tile to tile at corners.
.9 Counter/wall junctions at plastic laminate counters.

END OF SECTION

1. GENERAL

1.1 General Instructions

Read and be governed by the Contract and Sections of Division 1

1.2 Related Sections

1.2.1 Installation of steel doors and frames - under Section 081100.

1.2.2 Sealant to frame opening - under Section .

1.2.3 Glass and glazing - under Section 088100.

1.2.4 Painting - under Section 099100.

1.3 Quality Assurance

1.3.1 Quality Standards: Perform Work of this Section in accordance with requirements of Specifications for Commercial Steel Doors and Frames, 1990, of Canadian Steel Door and Frame Manufacturers' Association (CSDFMA), except as otherwise specified herein or shown.

1.3.2 Coordination: Give full cooperation to finish hardware distributor's representative during preparation of shop drawings and execution of shop fabrication.

1.4 Requirements of Regulatory Agencies

1.4.1 Construct fire rated doors and frames of ratings indicated, in accordance with validating label requirements and as otherwise required by jurisdictional authorities. Glazing areas to conform to requirements of the Ontario Building Code.

1.4.2 Fire rated labeled doors and frames: tested to CAN4-S104 and listed by a nationally recognized agency having a factory inspection service and shall be constructed as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.

1.5 Shop Drawings

1.5.1 Submit shop drawings in accordance with Section 013400.

1.5.2 Indicate each type of door and frame, material core thickness, reinforcements, glazing, location of exposed fasteners and arrangement of hardware.

1.5.3 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and in door schedule.

1.6 Site Storage and Protection of Materials

1.6.1 Inspect materials thoroughly upon receipt and report discrepancies, deficiencies and damages immediately, in writing, to the supplier.

1.6.2 Damages incurred during shipment shall be noted on the carriers' Bill of Lading and immediately reported, in writing, to the supplier.

1.6.3 Remove doors from their wrappings or coverings upon receipt on site, and store in a vertical position, spaced with blocking to permit air circulation.

1.7 Warranty

Warrant labour, materials and workmanship against defects and deficiencies for a period of two years from date of Substantial Performance of the Work.

2. PRODUCTS

2.1 Acceptable Manufacturers

2.1.1 The following manufacturers are approved for work of this Section:

.1	All Steel Door Ltd.	(416-297-8500)
.2	Ambico Limited	(613-746-4663)
.3	Artek Door (1985) Limited	(905-842-6695)
.4	Baron Metal Industries Inc.	(416-749-2111)
.5	Daybar Industries Limited	(905-625-8000)
.6	S.W. Fleming Limited	(905-683-3667)

2.2 **Materials**

2.2.1 Steel: commercial grade to ASTM A568-81, Class 1, hot-dip galvanized to ASTM A527-80, coating designation to ASTM A525-81, ZF75 (A25), 75 gm/m^2 (0.25 oz/ft), known commercially as 'Colourbond', 'Satincoat', or 'Galvanneal'.

2.2.2 Door core material; for non fire-rated doors: structural small cell 25 mm maximum kraft paper 'honeycomb'. Weight: 36.3 kg per ream (min). Density: 16.5 kg/m^3 (min) sanded to required thickness.

2.2.3 Door core material; for fire rated and temperature rise rated doors: as per tested assembly, Temperature Rise Rated (TRR) to CAN4-S104, ASTM E-152 or NFPA 252, where required.

2.2.4 Door core material; insulated doors:

.1 Rigid extruded, polystyrene, closed cell board. Density: 10 to 32kg/m. Thermal value: RSI 1.0 (min).

2.2.5 Adhesives:

.1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.

.2 Rigid insulation cores: Heat resistant, epoxy resin based, low viscosity, contact cement.

.3 Lock seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.

2.2.6 Primer: rust inhibitive for touch-up.

2.2.7 Miscellaneous:

.1 Door silencers: single stud rubber/neoprene type.

.2 Exterior top caps: Rigid polyvinylchloride extrusion to CGSB 41-GP-19Ma.

2.3 **Fabrication**

2.3.1 Fabricate doors and frames in accordance with details and approved shop drawings.

2.3.2 Fit and assemble Work in shop where possible. Make trial assembly in shop when not possible.

2.3.3 Fabricate, reinforce and anchor component parts and assemblies to support loads that usage will impose without deflection detrimental to function, appearance or safety.

2.3.4 Reinforce components to resist stresses imposed by hardware in use.

2.3.5 Prepare frames and doors for specified hardware with mortises, and reinforcement. Drill and tap to template information. Incorporate the following steel reinforcement and accessories:

.1 Lock/strike (also Crown Locks) reinforcements: 1.6 mm thick.

.2 Hinge reinforcements: 2.7mm (0.106") thick.

.3 Flush bolt reinforcements: 1.6mm (0.063") thick.

.4 Reinforcements for surface applied hardware: 1.2mm (0.047") thick.

.5 Top and bottom channels: 1.2mm (0.047") thick.

.6 Steel top caps: 1.6mm (0.063") thick.

.7 Glass stops: 0.9mm (0.035") thick.

.8 Mortar guard boxes: 0.8mm (0.032") thick.

.9 Floor anchors: 1.6mm (0.063") thick.

.10 Wall anchors:

- Masonry strap type: 1.2mm (0.047").
- Masonry wire type: 4.0mm (0.158") diameter.
- Masonry stirrup-strap type: 1.6mm (0.063").
- Steel stud type: 0.9mm (0.35").

.11 Jamb spreaders: 0.9mm (0.35") thick.

2.3.6 Provide for anticipated expansion and contraction of frames and supports.

2.3.7 Fit elements at intersections and joints accurately together, in true planes, and plumb and level.

2.3.8 Weld continuously at joints exposed to view or at joints through which air or water could penetrate from the exterior of building to the interior.

2.3.9 Perform welding to CSA W59-M1989.

2.3.10 Mortise, reinforce, drill and tap doors and frames and reinforcements to receive hardware using templates provided by respective supplier.

2.3.11 Touch up finish damaged during fabrication.

2.3.12 Glazing stops: formed channel, 15.9mm (5/8") high, accurately fitted, butted at corners and fastened to frame opening with counter-sunk oval head sheet metal screws, snap-on type at door lights. Locate exposed fasteners to glazing face as directed by Consultant.

2.3.13 Attach labels to doors and frames requiring fire-protection rating.

2.4 **Pressed Steel Frames**

2.4.1 Supply frames to suit construction conditions and dimensions as indicated on Drawings.

2.4.2 Fabricate frames of wipe coat galvanized steel.

2.4.3 Fabricate steel frames in minimum thickness of:

2.4.4 Typical frames: 16 minimum gauge sheet steel, welded type.

2.4.5 Attach two steel channel spreaders at bottom of door frames to maintain square alignment, secured to facilitate removal after frames that extend only to finish floor are built in.

2.4.6 Install three bumpers in interior frames at single opening latch jambs, and two at double door frame heads.

2.4.7 Fasten removable stops by counter-sunk Phillips head screws at approximately 225mm (9") O.C. symmetrically space on stop length.

2.4.8 Anchor frames to floor by 1.6mm (0.063") thick angle clips, welded to frame and provided with two (2) holes for floor anchorage.

2.4.9 Provide appropriate anchorage for floor and wall construction. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite the strike jamb. On each jamb, install two (2) anchors for openings up to and including 1525mm (5') high and install one (1) anchor for each additional height of 760mm (30") of height or fraction thereof, except as indicated below. Frames placed in previously placed concrete, masonry or structural steel shall be provided with anchors located not more than 150mm (6") from top and bottom of each jamb, and intermediate anchors at 660mm (26") oc maximum. Fasteners for such anchors shall be provided by Section 06200.

2.4.10 Secure frames set in previously constructed concrete or masonry openings by countersunk expansion bolts at same centres as for adjustable Tee wall anchors. Reinforce frame at fastening location to prevent indentation of frame by fastening device.

2.4.11 Grind welded corners to a flat plane, fill with metallic paste filler and sand to uniform smooth finish.

2.4.12 Protect strike and hinge reinforcements using guard boxes welded to frames at masonry construction.

2.4.13 Weld in two channel spreaders per frame, to ensure proper frame alignment.

2.4.14 Provide for anchorage of frames to floor slab.

2.4.15 Reinforce head of frames wider than 1220mm (48").

2.4.16 Brace frame units to prevent distortion in shipment and protect finish.

2.5 **Doors**

2.5.1 Fabricate of hollow metal construction with each face formed from flush sheet steel. Construct doors with specified core material typically solid rigid insulation at interior sound rated doors where indicated, laminated under pressure to face sheets and to fill core space completely. Close tops and bottoms of doors with recessed steel channels spot welded to face sheets.

2.5.2 Typical door sheet steel thickness: 18 gauge minimum.

2.5.3 Minimum panel thickness and type of construction applies only to doors not otherwise requiring heavier gauges or different construction to meet specified fire rated construction.

2.5.4 Fabricate doors of wipe coat galvanized steel. Fabricate exterior doors (and as noted) of galvanized steel.

2.5.5 Provide doors with 1.6mm (0.063") clearance at heads and jambs, and no more than 9.5mm (0.374") at floor. Provide clearance at floor with allowance made for intended finish flooring.

2.5.6 Bevel edges of stiles to suit door swing.

2.5.7 Blank, reinforce, drill and tap doors for mortised, templated hardware. Locate hardware to manufacturer's standard unless indicated otherwise.

2.5.8 Holes 12.7mm (1/2") and larger shall be factory prepared.

2.5.9 Fabricate removable stops of minimum 0.91mm (0.036") thick steel.

2.5.10 Prepare doors to receive glass and stops. Install glass. Secure removable stops with counter-sunk Phillips head screws at approximately 450mm (18") O.C., 50mm (2") from each end and symmetrically spaced on stop lengths. Locate removable stops on opposite of public accessible side of doors and screens.

2.5.11 Close top and bottom edges of exterior doors so that they are flush with face edges.

2.5.12 Fabricate closing stiles of paired doors as detailed on Drawing or Door Schedule.

2.5.13 Make provision for glass where indicated on Drawings or Door Schedule and provide glazing stops.

3. **EXECUTION**

3.1 **Installation**

Installation of metal doors and frames is specified under Section 081100.

END OF SECTION

1. GENERAL

1.1 General Instructions

Read and be governed by Conditions of the Contract and Sections of Division 1.

1.2 Related Sections

1.2.1 Installation of wood doors - under Section 062023.

1.2.2 Hollow metal frames - under Section 081100.

1.2.3 Architectural woodwork - under Section 064100.

1.2.4 Glass and glazing - under Section 088100.

1.2.5 Painting - under Section 099100.

1.3 References

1.3.1 Architectural Woodwork Institute AWI Quality Standards.

1.3.2 NFPA 80 - Fire Doors and Windows.

1.3.3 NFPA 252 - Fire Tests of Door Assemblies.

1.4 Submittals

1.4.1 Submit in accordance with Section 013300 and 013323.

1.4.2 Samples:

.1 Submit one 200mm x 200mm (8 x 8") corner sample full size door sample of each type wood door, to show stile and rail construction, core, cross banding and veneer indicated. Show cut-away of door components.

.2 Submit three samples 200 x 200mm (8 x 8") of wood veneer representing the typical range of colour and grain for the door veneer indicated, with factory finish specified.

1.4.3 Shop Drawings:

.1 Indicate door opening criteria, elevations, sizes, type, swings, details of core and edge construction, undercuts, beveling, special blocking, trim for openings.

1.4.4 Indicate AWI construction type, veneer selection, and factory machining criteria.

1.4.5 Product Data: Submit manufacturer's product data sheets for each type of door.

1.5 Performance Assurance

Perform work in accordance with AWI Premium Grade Quality.

1.6 Qualifications

Manufacturers shall be a member in good standing of the Architectural Woodwork Institute.

1.7 Delivery, Storage and Handling

1.7.1 Individual architectural door numbers shall be marked in the top hinge cavity created by the machining for hinges.

1.7.2 Package doors: identify with labels. Package with resilient packaging.

1.7.3 Store doors flat at site in piles with bottom face on bottom of piles protected from moisture by water resistant material under skids supporting piles, top of piles covered, and air circulation provided at sides of piles.

1.7.4 Deliver the wood doors only after the building is closed and dry, heated and ventilated. Do not receive the doors in a damp area. Do not drag the doors on the ground, floor or across one another.

1.8 **Warranty**

1.8.1 Promptly make good defects by replacing defective doors in finish to match adjacent similar doors or of original door finish to match by and in a manner satisfactory to Owner. Defects shall include, but not be limited to delamination of edges, warp, twist, bow exceeding 6mm (1/4"). "Replace" as used herein includes installing hardware, finishing, hanging and fitting.

Provide a warranty against defects attributable to material and workmanship:

.1 Solid core and solid hardwood doors: ten (10) years from date of Substantial Performance of the Work.

2. **PRODUCTS**

2.1 **Acceptable Manufacturers**

2.1.1 The following manufacturers are approved for work of this Section:

.1 Algoma Hardwoods, Inc. (Tel. 920-487-5221).
.2 Buell Door Co. (Tel. 214-827-9260).
.3 Cambridge Door Ltd. (Tel: 1-800-265-8688).
.4 JWS Manufacturing Inc. (Tel. 416-755-4131).
.5 Marshfield Door Systems, Inc. (previously known as Weyerhauser Door) (Tel. 800-869-3667).

2.2 **Interior Flush Doors**

2.2.1 Flush doors types, solid core:

.1 Flush interior doors: 45mm (1-3/4") thick; solid core construction, AWI type construction as indicated.
.2 Non-Rated or 20 minute doors: AWI SECTION 1300, Type PC-5, minimum 33 lbs/ftn particle core typical to ANSI A208.1 LD-2.
.3 45, 60, or 90 minutes fire rated doors: AWI SECTION 1300, Type FD-5, mineral (fire rated) core, complete with minimum 125mm (5") wide Tectonite blocking for closers, flush bolts, mortise pockets, and fire exit devices.
.4 Veneer types:
- Hardwood, for transparent finish: Cherry, AWI AA Grade, Slip Matched.
- Hardboard, for paint finish: High density hardboard.

.5 Edge; hardwood veneer doors: Close grain hardwood, stained to match wood veneer, as applicable.
.6 Wood glass stops; hardwood veneer doors: Premium Grade ' Cherry'.
.7 Adhesive: Type II (water resistant) for interior doors.
.8 Label: Provide to require fire resistance rating.

2.3 **Fabrication**

2.3.1 Fabricate doors in accordance with AWI Quality Standards, Premium Quality.

2.3.2 Bevel vertical edges of single acting doors 3mm in 50mm (1/8" in 2") on latch side and 1.52mm in 50 mm (1/16" in 2") on hinge side.

2.3.3 For 45, 60, or 90 minutes fire rated doors provide minimum 125 mm (5") wide Tectonite blocking for closers, flush bolts, mortise pockets, and fire exit devices.

2.3.4 Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware.

2.3.5 Factory pre-fit doors for frame openings and dimensions identified on shop drawings and schedules.

2.3.6 Undercut doors to provide 12.7 mm (1/2") clearance over finished flooring.

2.3.7 Prepare framed cutouts for glass. Provide glazing stops to match hardwood face specie and appearance, lip type moulding unless otherwise detailed; attach loosely in place, prepared for countersunk style screws.

2.3.8 Attach labels to doors requiring fire-protection rating.

2.4 **Shop Finishing of Wood Doors**

2.4.1 Finish work in factory in accordance with AWI Quality Standards - Section 015000.

2.4.2 Finish is plastic laminate: GP grade, 1.2mm thick, colour as selected by Consultant and approved by owner

2.4.3 Seal, stain, and varnish exposed and semi-exposed surfaces, AWI TR-2, catalysed lacquer, matte sheen, stain to Consultant's selection.

2.4.4 Factory seal top and bottom edges with minimum three coats oil based urethane sealer.

2.5 **Field Finishing of Wood Doors**

2.5.1 Factory seal top and bottom edges with minimum three coats oil based urethane sealer.

2.5.2 Field painted under work of Section 099100.

3. **EXECUTION**

3.1. **Installation**

3.1.1. Installation of wood doors is specified under Section 081400.

3.1.2. Repair or replace any door as directed by Consultant.

END OF SECTION

1. GENERAL

1.1 General Instructions

Read and be governed by Conditions of the Contract and Sections of Division 1.

1.2 Related Sections

1.2.1 Hardware - under Section 087100.

1.2.2 Glazing- under Section 088100

1.2.3 Automatic Door Operators- under Section 087113

1.2.4 Electrical disconnect switches and power - under Division 26 and 27.

1.3 Quality Assurance

Execute Work of this Section only by a certified installer who has adequate plant, equipment, and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past five years.

1.4 Samples

Submit samples of each finish material in accordance with Section 013323.

1.5 Shop Drawings

1.5.1 Submit shop drawings in accordance with Section 013323.

1.5.2 Clearly indicate each type of door and frame, method of assembly, section and hardware reinforcement, locations of exposed fasteners, finishes, etc.

1.6 Maintenance Data

Provide maintenance data for cleaning and maintenance of hardware for incorporation into maintenance manual specified in Section 017300.

1.7 Requirements of Regulatory Agencies

Use ULC or ULI listed and labeled hardware doors in fire separations and exit doors.

1.8 Templates

Submit templates to Contractor for use by installers and fabricators as required for proper location and installation of hardware.

1.9 Delivery and Storage

1.9.1 Store finishing hardware in locked, clean and dry area.

1.9.2 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

1.10 Protection

Apply temporary protective coating to finished surfaces. Remove coating after erection. Do not use coatings, such as masking tape or lacquer that will become hard to remove or leave residue.

1.11 Warranty

Provide an extended one year labour and material warranty for work of this Section. Total warranty: two years from date of Substantial Performance of the Work.

2. PRODUCTS

2.1 Aluminum Storefront

2.1.1 Kawneer Miscellaneous Framing (non-thermal storefront application) with railing mounted between mullions and glass stop assembly for 6.4mm (1/4") glazing. Use 127 (5") extruded tube for framing matching tube for corner application.

2.1.2 Kawneer aluminum 500Entrance door.

2.1.1.1. Coordinate connection to electric strike.

2.1.1.2. Provide narrow, jamb mount type, push button plate actuation switches with stainless steel finish and barrier free logo as selected by Consultant.

2.2 **Finishes**

2.2.1 Comply with AAMA-AFPA "Anodic Finishes/Painted Aluminum" for recommendations for applying and designating finishes:

2.1.1.3. All exposed aluminum surfaces to have Kawneer Permanodic® AA-M10C22A31, AAMA 611, Architectural Class II Clear Anodic Coating.

2.3 **Glazing**

As specified in Section 088100

2.4 **Hardware**

2.1.2. As specified in Section 088100

2.5 **Fabrication**

2.5.1 Fabricate aluminum-framed glass entrance doors in sizes indicated. Include a complete system for assembling components and anchoring doors.

2.5.2 Fabricate aluminum-framed glass doors that can be re-glazed without dismantling perimeter framing.

2.5.3 Accurately fit and secure joints and corners. Make joints hairline in appearance.

2.5.4 Prepare components with internal reinforcement for door hardware.

2.5.5 Arrange fasteners and attachments to conceal from view.

3. **EXECUTION**

3.1. **Examination**

3.1.1. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances.

3.2. **Installation**

3.2.1. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum swing entrance doors, hardware, accessories, and other components.

3.2.2. Install aluminum swing entrance doors level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

3.2.3. Set sill threshold in bed of sealant, as indicated, for weather tight construction.

3.2.4. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.2.5. Coordinate with requirements for door operator installation and security entry system.

3.3. **Hardware**

3.3.1. Weatherstripping shall be Kawneer Sealair® weathering. This is comprised of a thermoplastic elastomer weathering on a tubular shape with a semi-rigid polymeric backing

3.3.2. Sill Sweep Strips: EPDM blade gasket sweep strip in an aluminum extrusion applied to the interior exposed surface of the bottom rail with concealed fasteners.

3.3.3. Threshold: Extruded aluminum, one piece per door opening, with ribbed surface.

3.3.4. Butt Hinge: Kawneer Standard is Stainless Steel w/ Powder Coating & Non Removable Pin (NRP)

3.3.5. Push/Pull: style 'CO-12'.
3.3.6. Exit Device: ULC listed concealed Kawneer 1786.
3.3.7. Locks: Adams Rite MS 1850A-505 Hookbolt Lock

3.4. **Adjusting, Cleaning and Protection**

3.4.1. Clean aluminum surfaces immediately after installing aluminum framed storefronts. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
3.4.2. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
3.4.3. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION

1. GENERAL

1.1 General Instructions

Read and be governed by Conditions of the Contract and Sections of Division 1.

1.2 Related Sections

1.2.1 Installation of hardware - under Section 087100.

1.2.2 Electrical supply for automatic doors - under Division 26 and 27.

1.3 Extent of Work

1.3.1 Supply direct from factory, off-load, and place in designated hardware store room at the building Site, all Finish Hardware specified including necessary fastening devices.

1.3.2 Check and verify all hardware information on door and frame shop drawings, prior to fabrication.

1.3.3 Give on-site assistance to organize hardware storeroom and provide qualified staff to correctly categorize, mark, and arrange each item in groups to enable efficient dispensing in specified hardware groups for each door to installation trades.

1.3.4 Provide qualified staff on Site promptly to assist installation trades subsequent to being requested and to ensure that hardware is being correctly installed.

1.3.5 Upon completion of installation of hardware, hardware supplier shall arrange and conduct, in company of Consultant and Contractor, inspections to verify that all hardware is installed and functioning satisfactorily, and where necessary shall recommend adjustments of such items as closer arms, valves, door holders and latch and locksets. Report all comments in writing to Consultant and Contractor.

1.4 Codes

1.4.1 Hardware provided shall comply with codes and requirements of all governing authorities, and as specified.

1.4.2 Provide hardware items with characteristics which will provide specified fire ratings, and conform to exit requirements of all governing authorities.

1.5 Warranty

1.5.1 Provide a warranty against defects attributable to labour, material and workmanship for a period of two years, five years for closers, from date of Substantial Performance of the Work.

1.5.2 Contractor further agrees to promptly remove, replace and reinstall material, upon verification of defects in material, workmanship, or operation.

1.6 Submittals

1.6.1 Submit hardware schedules for review.

1.6.2 Maintenance Instructions:

.1 Instruct the Owner's designated representative in proper care and preventative maintenance of all hardware to assure longevity of operation.

.2 Provide three copies of descriptive information, operating, adjustment, and maintenance instructions, and "As-Built" record of location of each hardware group, spare parts list, and other pertinent information.

.3 Provide this information in 3-ring binders suitably identified in accordance with requirements of Section 017300.

1.7 Product Handling

1.7.1 Provide all template information drawings, promptly when requested, and provide three copies of installation instructions for each item supplied.

1.7.2 Package each item of hardware individually, complete with all trim and necessary fastenings, and accessories, including wrenches, keys, and other appurtenances required to ensure correct installation. Mark each item as to contents and appropriate use in specified groups.

1.7.3 All items of hardware subject to handling when installed shall be provided with an easily removable covering to protect against scratches, abrasions, coating with dissimilar finish materials on adjacent surfaces, and tarnishing.

1.8 **Templates**

1.8.1 Provide to Contractor for distribution, five (5) copies of all templates, template information, installation instructions and details necessary to enable preparation for, and installation of finish hardware in accordance with Door Hardware Institute recommended procedures. Submit templates arranged and marked coincident with specified hardware designations.

1.8.2 Provide promptly when requested, the foregoing information in 3-ring plastic hard-covered binders suitably identified.

1.8.3 In lieu of 1.7.1 and 1.7.2, arrange for the issue by each hardware manufacturer, the manufacturer's standard book of template drawings, at the option of door and frame manufacturers.

1.9 **Inspection**

1.9.1 Inspect the installation of finish hardware on an agreed frequency.

1.9.2 Advise in writing of any and all Work being performed which will prejudice the installation or correct operation of items of hardware.

1.9.3 Ensure all items have been installed complete with required trim and accessories, and fastenings are adequately secured and approved. Ensure closer arms, valves, holder devices, locksets and latchsets are correctly adjusted.

1.10 **Coordination**

1.10.1 Coordinate Work of this Section to ensure all information and material is promptly provided, to ensure orderly and expeditious progress of Work, and to comply with schedule for completion of all phases of Work.

1.10.2 Within three weeks of Contract Award, submit confirmed orders to manufacturers/suppliers to Consultant.

1.10.3 Assist Contractor to organize hardware storeroom and provide qualified staff to correctly categorize, mark, and arrange each item in groups to enable efficient dispensing in specified hardware groups for each door to installation trades.

1.11 **Schedules**

1.11.1 Prepare and submit for review, a separate Hardware Schedule for use on the Work, which shall list type, selected manufacturer's name and number, location, mounting heights and finish of all hardware, and complete cross reference to Door and Hardware Schedules.

1.11.2 Prepare and submit for review, a keying schedule recognizing Owner requirements which shall be determined after award of Contract.

1.12 **Jigs**

1.12.1 Provide template jigs for each component to be recessed to enable installation trades to prepare doors to preclude misalignment and improper fit.

2. **PRODUCTS**

2.1. **Schedule**

2.1.1. Purchase Finish Hardware with approved Cash Allowance in accordance with Section 012100.

2.2. **Fastening**

2.2.1. Hardware is to be installed with fasteners provided by the manufacturer to assure warranty coverage and ULC/cUL/WH requirements. The use of fasteners other than that supplied by the manufacturer may void all warranties.

2.2.2. All fasteners are to be matching finish and compatible to materials they are fastening.

2.2.3. All panic hardware shall be equipped with sex bolts if required.

3. EXECUTION

3.1. Examination

3.1.1. Before furnishing any hardware, carefully check Drawings of Work requiring hardware, verify door swings, door and frame materials and operating conditions, and assure that hardware will fit Work to be attached.

3.1.2. Check shop drawings and frame and door lists affecting hardware type and installation, and verify to correctness thereof, or advise of required revisions. Check that doors, frames and panels requiring additional support are reinforced.

3.1.3. Point out special requirements to installer. Make final adjustment of hardware, in particular closer arms, valves and locksets; all to work properly and locksets; all to work properly.

3.2. Installation

Installation shall be included in the Work under Section 062023

END OF SECTION

1. **GENERAL**

1.1. **General Instructions**

Read and be governed by Conditions of the Contract and Sections of Division 1.

1.2. **Related Sections**

1.2.1. Hardware - under Section 087100.

1.2.2. Aluminum Framed Storefront - under Section 085113

1.2.3. Electrical disconnect switches and power - under Division 26.

1.3. **Quality Assurance**

Execute Work of this Section only by a certified installer who has adequate plant, equipment, and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past five years.

1.4. **Samples**

Submit samples of each finish material in accordance with Section 013323.

1.5. **Shop Drawings**

1.5.1. Submit shop drawings in accordance with Section 013323.

1.5.2. Clearly indicate each type of door and frame, method of assembly, section and hardware reinforcement, locations of exposed fasteners, finishes, etc.

1.6. **Maintenance Data**

Provide maintenance data for cleaning and maintenance of hardware for incorporation into maintenance manual specified in Section 017300.

1.7. **Requirements of Regulatory Agencies**

Use ULC or ULI listed and labeled hardware doors in fire separations and exit doors.

1.8. **Templates**

Submit templates to Contractor for use by installers and fabricators as required for proper location and installation of hardware.

1.9. **Delivery and Storage**

1.9.1. Store finishing hardware in locked, clean and dry area.

1.9.2. Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

1.10. **Protection**

Apply temporary protective coating to finished surfaces. Remove coating after erection. Do not use coatings, such as masking tape or lacquer that will become hard to remove or leave residue.

1.11. **Warranty**

Provide an extended one year labour and material warranty for work of this Section. Total warranty: two years from date of Substantial Performance of the Work.

2. **PRODUCTS**

2.1. **Automatic Door Operators**

2.1.1. Automatic door operators shall be Besam Electra 150 or acceptable alternative by Dor-o-matic or Stanley. Provide "ON-OFF" switch for each door on header interior face.

2.1.1.1. Comply with the requirements of the Canadian Standards Association, all local code inspection requirements of the Hydro Electric Power Commission, and ANSI/BHMA A156.19.

2.1.1.2. Coordinate connection to electric strike.

2.1.1.3. Provide narrow, jamb mount type, push button plate actuation switches with stainless steel finish and barrier free logo as selected by Consultant.

2.2. **Finishes**

2.2.1. Finish components in accordance with Aluminum Association Designation System for Aluminum Finishes - 1973:

2.2.1.1. All exposed aluminum surfaces: to match storefront entrance framing finish.

2.3. **Fabrication**

2.3.1. Fit intersecting members to flush hairline weathertight joints and mechanically fasten together, except where indicated otherwise.

2.3.2. Conceal fastenings from view. Exposed fastenings where indicated.

2.3.3. Form cut-outs, recesses, mortising or milling for finishing hardware to templates supplied. Reinforce with aluminum or galvanized steel plates.

2.3.4. Field apply isolation coating to aluminum in contact with dissimilar metals, cementitious materials.

3. **EXECUTION**

3.1. **Installation**

3.1.1. Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.

3.1.2. Furnish manufacturers' instructions for proper installation of each hardware component.

3.1.3. Install door operator system only by its manufacturer's authorized distributor.

3.1.4. Install operator system complete in all its parts and connected to electrical service installed under Work of Division 16.

3.2. **Adjustment**

Verify under Work of this Section, that installed hardware functions properly, and instruct installers accordingly of requirements and procedures for adjustments to ensure satisfactory operation.

3.3. **Cleaning**

3.3.1. Cleaning on completion of installation:

3.3.1.1. Remove deposits which affect appearance or operation of units.

3.3.1.2. Remove protective materials.

END OF SECTION

1. GENERAL

1.1 General Instructions

Read and be governed by Conditions of the Contract and Sections of Division 1.

1.2 Related Sections

1.2.1 Sealants - under Section .

1.2.2 Glass and glazing of:

1.2.1.1 Architectural woodwork - under Section 064100.

1.2.1.2 Aluminum Storefront - under Section 085113.

1.2.1.3 Wood doors - under Section 081400.

1.3 Quality Assurance

1.3.1 Qualifications of Installers: Provide at least one trade specialist who shall be thoroughly trained and experienced in skills required, be completely familiar with referenced standards and requirements of this Work, and personally direct installation performed under this Section.

1.4 Glass Design

1.4.1 Design glass to CAN/CGSB-12.20-M89.

1.4.2 Design glass and glazing to requirements of authorities having jurisdiction.

1.5 Submittals

1.5.1 Shop Drawings: Submit full-size details indicating each type of glazing condition; show dimensions and all materials with complete notations in accordance with Section 0133213.

1.5.2 Samples:

1.5.2.1 Provide three 305mm (12") square glazing samples, of each glazing type, in accordance with Section 013323.

1.5.3 Data Manual: Provide maintenance and cleaning instructions for glass and glazing according to Section 017300. Advise of proper materials and methods of cleaning glass.

1.6 Warranty

1.6.1 Warrant glazing labour, materials and workmanship against defects and deficiencies for a period of two years from date of Substantial Performance of the Work. Warrant mirrors to remain free of delamination or silver deterioration for a period of five years from date of Substantial Performance of the Work. Replace at no extra cost to Owner, mirrors which do not meet above requirements.

2. PRODUCTS

2.1. Glass Materials

2.1.1. Float glass: Clear, float glass 6mm (1/4") thick minimum conforming to CAN/CGSB-12.3-M91, Glazing Quality.

2.1.2. Tempered glass: to CAN/CGSB-12.1-M90, Thickness; 6mm (1/4") minimum typical unless otherwise indicated. Provide in flat configurations shown. Polish and chamfer exposed edges. Provide data sheet certifying temper, product, weight and quality of glass with Data Manual.

2.2. Glazing Materials

2.2.1. Setting blocks: 70-95 Shore "A" durometer hardness.

2.2.2. Spacer shims: 40-60 Shore "A" durometer hardness.

2.2.3. Glazing gasket; interior screens: Black neoprene foam tape, as manufactured by Tremco or approved alternative.

2.2.4. Sealant for butt glazing: One component clear high modulus silicone sealant to CAN/CGSB-19.18 M87, as manufactured by Tremco, CGE or Dow Corning.

2.2.5. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

2.3. **Fabrication**

For exposed edge glass edge conditions: Grind and provide 1.5 mm (1/16") chamfer edges of frameless glass and polish.

3. **EXECUTION**

3.1. **Workmanship**

3.1.1. Install materials in accordance with manufacturer's specifications, and ensure that each material in a glazing system is compatible with the others.

3.1.2. Ensure projections are removed from rebates and sufficient depths and widths are provided.

3.1.3. Apply primer-sealer to contact surfaces.

3.1.4. Install glass, rest on setting blocks, and ensure full contact and adhesion at perimeter.

3.1.5. Install removable stops, without displacing tape or sealant.

3.1.6. Do not cut or abrade tempered or coated glass.

3.2. **Glazing**

3.2.1. Cut glass to fit openings and to allow clearance which will ensure that glass is held firmly in place and is not subjected to stresses.

3.2.2. Ensure that glass edges are clean cut, not nipped or seamed.

3.2.3. Do not cut or nip tempered glass to fit. Replace oversize or flared lights with entirely new units of proper dimensions.

3.2.4. Where indicated, provide spacers for size and spacing required for glass sizes larger than 50 united inches, except where gaskets or preshimmed tapes are used for glazing. Provide 6mm (1/4") minimum bite of spacer on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.

3.2.5. Set units of glass in each series with uniformity of pattern draw, bow and similar characteristics.

3.2.6. Where sealants are used at butt joints, apply sealant in thin continuous clear bead.

3.2.7. Glazing Preparation and Methods:

3.2.7.1. Clean glazing rebate surfaces of all traces of dirt, dust, or other contaminants.

3.2.7.2. Use glazing sealants without addition of thinners and from only containers with seals unbroken until opened for use.

3.2.7.3. Prime all glass rebates except for aluminum or stainless steel, unless otherwise recommended by glazing material manufacturer. Primer shall be suitable for materials affected.

3.2.7.4. Ensure that glazing sealants and tapes are in full contact with glazing surfaces.

3.2.8. Position glazing tape for proper seal and bedding at fixed stops.

3.2.9. Hollow Metal Doors and Frames: Specified under Work of Section 081100. Fixed stop bedding, glazing tape, removable stops, glazing tape.

3.3. **Finishing**

3.3.1. Immediately remove sealant and compound droppings from finished surfaces. Remove labels after work is completed.

3.3.2. Final cleaning of glass is specified as a part of the Work of Section 017413.

3.3.3. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents, and vandalism.

3.3.4. Wash and polish glass on both faces not more than four days prior to date scheduled for inspections intended to establish Date of Substantial Performance in each area of project. Comply with glass manufacturer's recommendations for final cleaning.

END OF SECTION

1. GENERAL

1.1 General Instructions

Read and be governed by the Contract and Sections of Division 1.

1.2 Related Sections

1.2.1 Wood blocking - under Section 061000.
1.2.2 Firestopping - under Section 078400.
1.2.3 Metal stud system - under Section 092200.
1.2.4 Tile - under Section 093013.
1.2.5 Supply of access doors - under Divisions 21, 22, 23, 26 and 27.

1.3 Submittals

Product Data: Submit manufacturer's product specifications and installation instructions for each gypsum board component, including other data as may be required to show compliance with these specifications.

1.4 Quality Assurance

1.4.1 Skilled trades personnel performing the Work of this Section shall have a minimum of five years continuous experience in successful installation of work of type and quality shown and specified.
1.4.2 Single Source Responsibility: Obtain gypsum board products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum boards.
1.4.3 Fire Resistance Rating: Where gypsum board systems with fire resistance ratings are indicated or required, provide materials and installations which are identical with those of applicable assemblies tested by fire testing laboratories acceptable to authorities having jurisdiction.

1.5 Fire Resistant Assemblies

Materials for fire resistive construction shall conform to requirements of indicated fire rated assembly.

1.6 Delivery, Storage and Handling

1.6.1 Package finish materials.
1.6.2 Store materials in protected dry areas. Store gypsum board flat in piles with edges protected.
1.6.3 Ensure that finish metal members are not bent, dented, or otherwise deformed.
1.6.4 Deliver products supplied under the Work of this Section only to those who are responsible for installation, to the place they direct, and to meet installation schedules.
1.6.5 Package fire rated materials with labels attached.

1.7 Site Conditions

1.7.1 Environmental Requirements, General: Comply with requirements of referenced gypsum board application standards and recommendations of gypsum board manufacturer, for environmental conditions before, during and after application of gypsum boards.
1.7.2 Cold Weather Protection: When ambient outdoor temperatures are below 12ºC maintain continuous, uniform comfortable building working temperatures of not less than 12°C for a minimum period of 48 hours before, during and following application of gypsum board and joint treatment materials or bonding of adhesives.
1.7.3 Ventilation: Ventilate building spaces as required to remove water in excess of that required for drying of joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent too rapid drying.
1.7.4 Protection: Provide adequate protection of materials and Work of this Section from damage by weather and other causes. Protect Work of other trades from damage resulting from Work of this Section. Make good such damage.

2. PRODUCTS

2.1. Panels

2.1.1. Plain gypsum board panels: standard 12.7mm (1/2"), 16mm (5/8") thick, unless otherwise noted, 1220mm (48") wide x maximum practical length, ends square cut, tapered edges, to ASTM C36-95 and/or ASTM C79-94.

2.1.2. Fire-rated gypsum board panels: Type X, thickness of 12.7mm (1/2"), 15.9mm (5/8"), 19mm (3/4") or 25mm (1") as required, with tapered edges, or as classified for fire rated assembly as noted, to ASTM C36-95 and/or ASTM C79-94.

2.2. Fasteners

2.2.1. Screws; for gypsum board: bugle head, fine thread, self-tapping, Type S or S-12 point to suit stud gauge, with corrosion resistant finish. Screw sizing:

1. #6 x 25mm (1") for single thickness board fastening.
2. #6 x 32mm (1-1/4") for single thickness 15.9mm (5/8") board fastening.
3. #7 x 41mm (1 5/8") for double thickness board fastening.

2.2.2. Tie wire: 1.6mm (0.063") dia. galvanized soft annealed steel wire.

2.3. Accessories

2.3.1. Casing beads: Bailey D200, CGC 200A, Nicholson Rollforming Metal Trim 200-B fillable edge trim (Do not use J-moulds), 0.55mm (0.022") base thickness commercial grade sheet steel with zinc wiped coating to ASTM A 525-93; perforated flanges; one piece length per location.

2.3.2. Corner beads: Bailey D100, CGC Dur-a-bead, Nicholson Rollforming No. 114, fillable edge trim, 0.55mm (0.022") base thickness commercial grade sheet steel with zinc wiped coating to ASTM A 525-93 ; perforated flanges; one piece length per location.

2.3.3. Control joints: No. 093 Zinc Control Joint by CGC Inc. or Nicholson Rollforming.

2.3.4. Aluminum gypsum board trim: extruded alloy 6063-T5 consisting of fin, tapered, grooved, and prepunched for screw attachment and bonding agent, as manufactured by Gordon, Inc. or approved alternatives by Softforms or Fry Reglet.

2.4. Joint and Adhesive Materials

2.4.1. Joint reinforcing tape; for gypsum board: 50mm (2") x 0.3mm (0.01") thick, perforated paper, with chamfered edges.

2.4.2. Joint compound; for gypsum board: asbestos-free. Latex, resin base, possessing good adhesion, mixed with fresh, unadulterated water having no detrimental effect on compounds, to ASTM C 475; type recommended by manufacturer for application indicated.

2.4.3. Joint compound; for gypsum board to receive tile finish: setting-type powder based joint finishing compound: Durabond by CGC or approved alternate.

2.4.4. Laminating adhesive: as per gypsum board manufacturer's printed installation instructions, to suit application.

2.5. Acoustical Sound Control Partition Materials

2.5.1. Acoustic sealant: purpose made, non-skinning, non-hardening type to CAN/CGSB-19.21-M87, as manufactured by Tremco or Bakor.

2.5.2. Sound attenuation insulation:

2.5.2.1. Mineral fibre sound attenuation batts: to CAN/ULC-S702-97, and CAN/ULC-S114-1980(R1997), Roxul 'AFB' or Owens Corning 'QuietZone'.

2.5.2.2. Fasteners: use mechanical fasteners to secure batts into position as recommended by manufacturer.

3. EXECUTION

3.1. Installation

3.1.1. General: Comply with ASTM C840, Specification for Application and Finishing of Gypsum Board, and manufacturer's instructions, except as modified herein. Do not bridge building expansion joints with support system. Frame both sides of joints with furring and other supports as indicated.

3.1.2. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards, Butt boards together for a light contact at edges and ends with not more than 1.6mm (1/16") open space between boards. Do not force into place.

3.1.3. Cover both faces of stud partition framing with gypsum board in concealed spaces (above ceiling, etc) unless otherwise indicated, except in chase walls which are properly braced internally.

3.1.4. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.

3.1.5. Securely attach trim, casings, framing, and accessories.

3.1.6. Apply components of a fire-rated assembly in conformance with indicated designs.

3.1.7. Erect materials to dimensions indicated on Drawings, plumb, level, straight, and square to adjoining elements.

3.1.8. Make allowance for thermal movements in gypsum board systems. Provide clearances between work of this Section and structural elements to prevent transference of structural loads.

3.1.9. Do not apply gypsum board in close proximity to hot pipes or heating ducts.

3.1.10. Install materials with the minimum number of joints. Tightly butt joints, without force, and neatly align them.

3.1.11. Frame openings on every side. Provide clearances with services.

3.1.12. Work shall include bulkheads over doors, frames, screens, and changes in ceiling levels, pipe space and as indicated on Drawings.

3.2. Accessories

3.2.1. At external corners install corner trim secured to framing at 230mm (9 1/16") O.C. on both flanges with screw fasteners or clinch tool.

3.2.2. Secure casing trim at board edges where exposed to view, where board butts against other materials with no trim to conceal junction, at perimeter of ceiling surfaces at tops of partitions where they stop against continuous ceiling surfaces, and where indicated.

3.2.3. Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure in accordance with manufacturer's specifications unless otherwise required.

3.3. Board Application - General

3.3.1. Before application of gypsum board commences, ensure that services have been installed, tested, and approved; that conduits, pipes, cables, and outlets are plugged, capped, or covered; and that fastenings and supports installed by others are in place.

3.3.2. Extend board into door, window, and other openings, reveals, behind fitments, and other applied items and on metal stud partitions to structure above unless indicated otherwise.

3.3.3. Locate joints on opposite sides of partitions on different studs, and at least 305mm (12") from opening jambs.

3.3.4. Install board to minimize joints, and align end joints to be the least objectionable (where they are unavoidable), according to the indicated lighting design. Locate joints in ceilings where least prominently discerned, and never line them up with opening edges.

3.3.5. Form smooth joints at ends and at field cut edges of board panels.

3.3.6. Fasten board to metal support members by metal gypsum board screws, 9.5mm (0.374") minimum to, and 12.7mm (1/2") maximum from, center of joints. Space screws:

3.3.7. At ceilings of fire rated board at 200mm (8") o/c at edges and in field unless otherwise required.

3.3.7.1. At walls of fire rated board at 200mm (8") o/c at edges and 305mm (12") o/c in field. Locate screws opposite one another in adjacent panels unless otherwise required.

3.3.7.2. At typical board walls at 400mm (16") o/c at edges and field unless otherwise required.

3.3.7.3. At typical board ceilings at 305mm (12") o/c at edges and field unless otherwise required.

3.3.8. At laminated board locations: Apply adhesive with notched spreader to leave ribbons 10mm x 13mm (3/8" x 1/2") at 38mm (1-1/2") apart over entire back side of face layer. Erect board immediately after spreading adhesive. Temporarily secure face boards with screws or bracing to ensure adequate bond until adhesive sets. Temporary face screws may also be used.

3.3.9. Offset gypsum board seams from corners of openings.

3.4. **Curved Partition Installation**

3.4.1. Framing Erection:

3.4.1.1. Cut top and bottom runner through leg and web at 51mm (2") intervals for arc length. Allow 300mm (12") uncut straight runner at each end of arc. Bend runners to uniform curve of specified radius. Clinch a 25mm (1") x 25 ga. steel strip to inside of cut leg using metal lock fastener. Attach steel runners at floor and ceiling to structural elements with suitable fasteners located 51mm (2") from each end and spaced 600mm (24") o.c. To suspended ceilings, use toggle bolts or hollow wall anchors spaced 400mm (16") o.c.

3.4.1.2. Position studs vertically, with open side facing in same direction and engaging floor and ceiling runners. Begin and end each arc with a stud and space intermediate studs equally along outside of arc. Secure studs to runners with 10mm (3/8") pan head framing screws. On tangents, place studs 150mm (6") o.c. leaving last stud freestanding. Install balance of stud system in normal manner according to specifications.

3.4.2. Gypsum Panel Preparation:

3.4.2.1. Select length and cut panel so one unbroken panel covers curved surface and 300mm (12") tangets at each end. Outside panel must be longer than inside panel to compensate for additional radius contributed by studs.

3.4.2.2. When wet panels are required, evenly spray water per manufacturer's directions on the surface to be in tension when panels are hung. Panels, while wet, should be bent to desired radius. They should be allowed to set in this shape prior to installation.

3.4.3. Gypsum Panel Erection:

3.4.3.1. Apply gypsum panels horizontally with the wrapped edges perpendicular to studs. On the convex side of the partition, begin installation at one end of the curved surface and fasten panel to studs as it is wrapped around the curve. On the concave side, start fastening panel to the stud at the centre of the curve and work outward to the panel ends. Fasten single-layer panels with 25mm (1") Type S screws spaced 300mm (12") o.c. 3.4.3.2 For double-layer application, apply base layer horizontally and fasten to stud with 25mm (1") Type S screws spaced 400mm (16") o.c. Centre face layer panels over joints in the base layer and secure to studs with 41mm (1-5/8") Type S screws spaced 300mm (12") o.c. Allow panels to dry completely before applying joint treatment.

3.5. **Acoustical Sound Control Partitions**

3.5.1. Acoustical sealant and plaster:

3.5.1.1. Apply bead of acoustic sealant to seal both sides of partition assembly between gypsum board and adjacent floor, wall, and ceiling assembly of partitions which contain sound attenuation insulation, and where noted.

3.5.1.2. Apply bead of acoustic sealant to seal both sides of partition assembly at control joints and at partition intersections.

3.5.1.3. Apply bead of acoustic sealant to seal intersections with sound-isolating partitions that are extended to reduce sound flanking paths.

3.5.1.4. Apply bead of acoustic sealant to seal joint between penetrations (ie. electrical boxes, ducts, et cetera.) and gypsum board.

3.5.1.5. Seal holes at perforated penetration objects (ie. electrical boxes) with coating of premixed plaster or acoustic sealant.

3.5.1.6. Apply sealant to clean, dry surfaces.

3.5.2. Sound control insulation:

3.5.2.1. Install sound control insulation wherever insulation in partitions is indicated. Consider such partitions to be "acoustical sound control partitions".

3.5.2.2. Install acoustical insulation in partitions so indicated by filling voids with batts of specified thickness.

3.5.2.3. Maintain air space between backs of acoustical insulation and back of opposite face layer, as applicable.

3.5.2.4. Pack acoustical insulation against ducts, conduits and services passing through acoustical sound control partitions.

3.5.2.5. Extend acoustical sound control partitions to underside of structure. Incorporate approved provision to obviate transmittance of structural deflection to partition assembly.

3.5.2.6. Staple sound control insulation where required by manufacturer's data.

3.5.2.7. Where studs are not faced with gypsum board on both sides, mechanically fasten wire mesh to non-faced side of stud to retain insulation.

3.6. **Control Joints**

3.6.1. Provide continuous polyethylene dust barrier behind and across control joints.

3.6.2. Provide control joints set in gypsum board facing. Support control joints with studs or furring channels on both sides of joint. Provide control joints in agreed upon locations where:

3.6.2.1. Partition, furring or column fireproofing abuts a structural element (except floor) or dissimilar wall or ceiling;

3.6.2.2. Ceiling abuts a structural element, dissimilar wall or partition or other vertical penetration;

3.6.2.3. Construction changes within the plane of the partition or ceiling;

3.6.2.4. Partition or furring run exceeds 10m (30');

3.6.2.5. Ceiling dimensions exceed 15m (50') in either direction with perimeter relief, 10 m (30') in either direction.

3.6.2.6. Wings of "L", "U", and "T" shaped ceiling areas are joined;

3.6.2.7. Expansion or control joints occur in the base exterior wall.

3.6.3. Line up control joints with joints in other construction or with center lines of mullions, columns, piers, or similar building elements, and where accepted by Consultant.

3.6.4. Install control joints straight and true.

3.6.5. Ceiling height door frames may be used as control joints. Less than ceiling height frames should have control joints extending to the ceiling from both corners. If control joints are not used, additional reinforcement is required at corners to distribute concentrated stresses.

3.7. **Access Doors**

3.7.1. Install access doors to electrical and mechanical fixtures specified in respective Sections.

3.7.2. Access doors shall be as supplied to this Section by Division 23 and 26 Locations shall be reviewed and confirmed by Consultant.

3.7.3. Install access panels in locations to be determined by coordination with trades installing mechanical, electrical and other building services. Consultant has the right to relocate access panels up to 3m (10ft.) from locations shown on Architectural Drawings due to Site conditions.

3.7.4. Rigidly secure frames to furring or framing systems.

3.8. **Taping and Filling**

3.8.1. Finish gypsum wallboard in strict accordance with ASTM C840-95 and as follows.

3.8.2. Tape and fill joints in gypsum board except at exterior sheathing, backboards and coreboards. Perform joint taping and filling, and spotting over fastener heads according to manufacturer's directions.

3.8.3. Finished joints will be accepted with a camber not greater than 1mm (1/32") and shall be seamless, plumb, true and flush and with square, neat corners.

3.8.4. Perform filling either manually using specialized tools of the trade or by mechanical taping and filling machine of proven efficiency.

3.8.5. Finish edges of gypsum board in exposed Work using approved metal casing bead, corner bead or similar approved metal moulding. Provide metal edging at all junctions with dissimilar materials, juncture of gypsum board ceiling and wall and juncture of demising partitions with structural or service column enclosures. Include corner beads on external corners.

3.8.5.1. Mitre and fit corners and junctions accurately and free from rough edges. Secure casing beads at 305mm (12") o/c maximum. Erect casing beads plumb or level, with minimum joints.

3.8.5.2. Apply successive coats mechanically 250mm (10") wide on both sides of butt joints.

3.8.5.3. Apply two coats of filler, one coat of topping compound and sand lightly with fine sandpaper between coats when dry to leave a smooth finished surface.

3.8.6. At board fasteners: fill holes and depressions with a two coat application of joint filler.

3.8.7. Completed installation to be smooth, level or plumb, free from waves and other defects and ready for painting.

3.9. **Skim Coat Gypsum Board Finishing**

Follow applicable requirements for taping and filling, for walls receiving high gloss paint and where indicated: Over the third coat, apply a thin skim coat of joint topping compound over the entire surface of gypsum board to provide a flat uniform surface for painting. Use trowel or broadknife, finally wiping compound as tightly as possible over the board surface.

3.10. **Column Cladding**

Gypsum wallboard column enclosure must be finished smooth, seamless, plumb, true and flush, having square, neat corners. Finished face of each side must be 90º to adjacent side unless indicated otherwise on drawings.

3.11. **Fire Separations**

Install fire-rated assemblies in strict accordance with assembly listing requirements in order to obtain fire ratings shown on Drawings and as required by authorities having jurisdiction.

3.11.1 Vertical bulkheads in ceiling spaces over fire rated glazed partitions, doors and the like shall have same fire rating as the door or partition over which they occur. All such bulkheads shall be of gypsum wallboard construction unless otherwise noted.

3.12. Use fire rated gypsum wallboard as specified.

3.13. Where lighting fixtures, diffusers, and the like are recessed into fire rated ceilings or bulkheads, provide enclosure to maintain required fire rating. Form removable panel to give access to fixture outlet box.

3.14. Where fire hose cabinets or other fixtures or equipment are recessed in fire rated walls or partitions, provide gypsum board enclosure or backing to maintain required fire rating, unless otherwise detailed.

3.15. **Special Cleaning**

3.15.1. Clean up and remove surplus materials and rubbish resulting from this Work on completion and when directed.

3.15.2. Clean off beads, casings, joint compound droppings and the like, leave Work ready for painting trades.

END OF SECTION

1. **GENERAL**

1.1 **General Instructions**

Read and be governed by Conditions of the Contract and Sections of Division 1.

1.2 **Related Sections**

Gypsum board - under Section 092116

1.3 **Submittals**

1.3.1 Samples:

1.3.1.1 Submit sample of each component of ceiling system to Consultant for review, in accordance with Section 013323.

1.3.1.2 Submit samples, load test data and design tables for each type of insert to be used on this project for hanger supports.

1.3.2 Product Data: Submit manufacturer's product specifications and installation instructions for each component and system to be used, including other data as may be required to show compliance with these specifications.

1.4 **Fire Resistant Assemblies**

Materials for fire resistive construction shall conform to requirements of indicated fire rated assembly.

2. **PRODUCTS**

2.1. **Partition Support Materials**

2.1.1. Interior non-loadbearing channel stud framing: to ASTM C645-76; as indicated; roll formed from 0.5mm (25 gauge) minimum thickness unless otherwise indicated electro-galvanized steel sheet; for screw attachment of gypsum. Provide service holes starting at 450mm (18") from bottom, then 914mm (36") o.c. to top of studs.

2.1.2. Runner fasteners:

2.1.2.1. To concrete and masonry: Use stub nails or power-driven fasteners.

2.1.2.2. To metal concrete inserts: Use 10mm (3/8") Type S-12 Pan Head screws.

2.2. **Ceiling Support Materials and Systems**

2.2.1. General: Size ceiling support components to comply with ASTM C754 unless otherwise indicated.

2.2.2. Main Runners: Steel channels, hot or cold rolled; galvanized where used in shower rooms, other wet areas, and outdoors; with rust inhibitive paint finish where used elsewhere indoors.

2.2.3. Hanger Wire: ASTM A641, soft, Class 1 galvanized, Min. 4.064mm (8 IWG).

2.2.4. Hanger Rods and Flats: ASTM A510, Mild steel with zinc coating.

2.2.5. Hanger Anchorage Devices:

2.2.5.1. Screws, clips, bolts, concrete inserts or other devices applicable to the indicated method of structural anchorage for ceiling hangers and whose suitability for use intended has been proven through standard construction practices or by certified test data. Size devices for 4 X calculated load supported except size direct pull-out concrete inserts for 5 X calculated loads.

2.2.5.2. Powder actuated fastening systems are not permitted.

2.2.5.3. Fasteners exposed to weather, condensation, and corrosion: Zinc-plated or stainless steel fasteners in applicable product lines specified in preceding paragraphs.

2.2.6. Tie Wire: ASTM A641, 1.65mm (16 IWG) zinc coated annealed wire.

2.2.7. Furring Anchorages: 16 gauge galvanized wire ties, manufacturer's standard wire type clips, bolts, nails or

2.2.8. Runner (Carry) channels: 1.6 mm thick cold rolled steel, primer painted or zinc coated for interior locations, Z275 galvanized for exterior locations:

2.2.8.1. 38mm (1 1/2") x 12.7mm (1/2") where supported at centers of 914mm (36") maximum.

2.2.8.2. 38mm (1 1/2") x 19mm (3/4") where supported at centers of 1220mm (48") maximum.

2.3. **Furring**

2.3.1. Furring channels: 0.55mm (25 gauge) thick minimum thickness, cold rolled steel, wiped coated, nominal size of 22mm (7/8") depth x 35mm (1 3/8") face, hat type with knurled face.

2.3.2. Resilient furring channels RC-1 sheetrock as manufactured by Canadian Gypsum Company or Resilient Channel as manufactured by Nicholson Rollforming or Bailey Metal.

2.3.3. Z-Furring Members: Manufacturer's standard screw type galvanized steel, zee-shaped furring members; ASTM A 525, G60, 0.8mm (22 gauge) minimum thickness of base metal, of depth indicated, designed for mechanical attachment of insulation boards or blankets.

2.3.4. Fasteners for Furring Members: Type and size recommended by furring manufacturer for substrate and application indicated.

3. **EXECUTION**

3.1. **Installation General**

3.1.1. Comply with ASTM C754, Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Board and manufacturer's instructions, except as modified herein. Do not bridge building expansion joints with support system. Frame both sides of joints with furring and other supports as indicated.

3.1.2. Provide necessary studs, framing and furring systems to provide proper support for gypsum board in accordance with good industry practice and manufacturers' written instructions and as indicated on Drawings and Specifications.

3.1.3. Give complete cooperation and direction to trades erecting framing and furring over which this Work is applied. Coordinate finished joint location with framing.

3.1.4. Coordinate installation and cooperate with Mechanical and Electrical trades to accommodate mechanical electrical items and any other Work required to be incorporated into or coordinated with the partitions, ceiling and soffit systems.

3.1.5. Provide clearances between work of this Section and structural elements to prevent transference of structural loads.

3.1.6. Attach to framing adequate wood reinforcing members to (minimum 19mm (3/4") thick) support the load of, and to withstand the withdrawal and shear forces imposed by, items installed upon the Work of this Section. Such items are, but not restricted to, coat hooks, washroom accessories, handrail anchors, guards, wall-hung cabinets and fitments, shelving, drapery tracks, and minor mechanical and electrical Work.

3.2. **Furring - General**

3.2.1. Furring indicated on drawings is schematic. Do not regard as exact or complete. Provide all necessary framing and furring to support gypsum board in accordance with manufacturers' specifications.

3.2.2. Leave finished work rigid, secure, square, level, plumb, and curved to detailed radius and erected to maintain finish gypsum board line dimensions and contours. Make allowance for thermal movement.

3.2.3. Thermally separate metal studs from exterior concrete or masonry.

3.3. **Suspended and Furred Ceilings**

3.3.1. Arrange hangers for suspended gypsum board ceilings to provide support independent of walls, columns, pipes, ducts; erect plumb, and securely anchored to structural frame, or embed in concrete slabs.

3.3.2. Space hangers at 914mm (36") o/c max. along runner channels, and not more than 150mm (6") from ends.

3.3.3. Space runner channels at 1220mm (48") o/c max. and not more than 150mm (6") from boundary walls, interruptions of continuity, and changes in direction. Run channels transversely to structural framing members.

3.3.4. Where splices are necessary, lap members at least 200mm (8") and wire each end with two (2) loops. Avoid clustering or lining up of splices.

3.3.5. Attach to rod hangers by bending hanger sharply under bottom flange of runner, and securely wiring in place with saddle tie.

3.3.6. Erect cross furring channels transversely across runner channels at 400mm (16") o/c max., 305mm (12") o/c at fire rated assemblies, at not more than 150mm (6") from boundary wall openings, interruptions in ceiling continuity, and changes in direction.

3.3.7. Secure furring channels to each support with purpose-made slips or wire tie. Splice joints by lapping channels and tying together.

3.3.8. Install proprietary ceiling systems in accordance with manufacturer's printed directions.

3.3.9. Level cross furring channels to max. tolerance of 1:1000.

3.4. **Wall Furring**

3.4.1. Install steel furring for braced walls, free standing walls, walls that are furred out as indicated.

3.4.2. Frame openings and around built-in equipment, cabinets, access panels, on four (4) sides, with channels. Extend furring into reveals. Check clearances with equipment suppliers.

3.4.3. Construct bulkheads and boxed-in duct shafts, for beams, columns, pipes and around exposed services where indicated. Install 19mm (3/4") channels at corners and at 305mm (12") o/c.

3.5. **Resilient Furring**

3.5.1. Erect gypsum board resilient furring maximum 610mm (24") o/c and not more than 150mm (6") from ceiling/wall juncture. Secure to each support with 25mm (1") gypsum wallboard screw.

3.5.2. Install 150mm (6") continuous strip of 12.7mm (1/2") gypsum board along base of partitions where resilient furring installed.

3.6. **Metal Stud Partition Framing**

3.6.1. Provide partition tracks (runners) at floor and underside of structural assembly; and to underside of acoustic ceiling suspension system as indicated on Drawings.

3.6.1.1. Align accurately and lay out according to partition layout.

3.6.1.2. Secure runners with fasteners located 50mm (2") from each end and spaced at maximum 610mm (24") o.c.

3.6.1.3. At partition corners, extend one runner to end of corner and butt other runner to it, allowing necessary clearance for gypsum board thickness. Runners should not be mitred.

3.6.2. Unless otherwise indicated, place interior studs vertically at centres indicated in following schedule, and not more than 50mm (2") from abutting walls, openings and each side of corners. Install studs at 400mm (16") o/c, and as specially spaced in accordance with details shown. Install studs in tracks at floor and ceiling. Cut studs to provide freedom for 13mm (1/2”) deflection under beams, structural slabs and the like to avoid transmission of structural loads to studs, or install 50mm (2") leg ceiling tracks.

3.6.3. Install studs of depth indicated on Drawings but in no case span partition studs between supports for a deflection of not more than L/240 and the following:

3.6.3.1. 41mm (1 5/8") studs: 2896mm (9’-6") maximum span;

3.6.3.2. 64mm (2 1/2") studs: 3810mm (12’-6”) maximum span;

3.6.3.3. 92mm (3 5/8") studs: 4877mm (16") maximum span.

3.6.3.4. 152mm (6”) studs: 6096mm (20’) maximum span.

3.6.4. Where horizontal runs of service lines are scheduled to be installed, arrange with applicable trades and install studs simultaneously with services.

3.6.5. At openings in stud walls, erect track at head and sills to accommodate intermediate studs. At each end of track, cut out flanges, turn up web, and fasten to studs. Install intermediate studs above and below openings in same manner and spacing as wall studs. Install double studs at each jamb, and double tracks at head of door openings.

3.6.6. At partitions requiring fire rating, erect in accordance with requirements of listing. At penetrated openings in fire rated walls see requirements of Section 078400 for framed openings.

3.6.7. Install studs of depth indicated on Drawings but in no case span studs between supports at no greater span than L/240 according to manufacturer's span tables.

3.6.8. Erect three studs at corner and intermediate intersections of partitions.

3.6.9. Co-ordinate Work with others installing horizontal runs of service lines so that Work of all is done simultaneously. Where standard holes are too small for installed services, notch studs, and splice notched flanges with splice pieces 305mm (12") longer than notches, each fastened with two screws.

3.6.10. Install resilient furring channel transverse to framing members, or as indicated, spaced at maximum 610mm (24") o/c and within 150mm (6") of wall/ceiling juncture.

3.6.11. Erect metal studding to tolerance of 1:1000.

3.6.12. Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.

3.6.13. Co-ordinate erection of studs and furring with installation of door/window frames and special supports or anchorage for work specified in other Sections.

3.6.14. Maintain 12.7mm (1/2") clearance to avoid transference of structural loads to studs.

3.6.15. Chase Walls:

3.6.15.1. Provide cross bracing consisting of metal furring, located at quarter points on each pair of studs. Attach cross bracing to studs with metal screws. Coordinate construction of partitions to suit installation of services.

END OF SECTION

1. GENERAL

1.1. General Instructions

Read and be governed by Conditions of the Contract and Sections of Division 1.

1.2. Related Sections

1.2.1. Sealants - under Section.
1.2.2. Gypsum board - under Section 092116.
1.2.3. Washroom accessories - under Section 102800.

1.3. Quality Assurance

Execute Work of this Section only by a Subcontractor who has adequate plant, equipment, and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past five years.

1.4. Reference Standards

Do tile work in accordance with Specification Guide 093013, Tile Installation Manual 1998 as produced by Terrazzo, Tile and Marble Association of Canada (TTMAC), the Tile Council of America 1991 Handbook for Ceramic Tile Installation, except where specified otherwise.

1.5. Samples

1.5.1. Submit 305mm (12") x 305mm (12") sample panels of each colour, texture, size, pattern of tile and grout in accordance with Section 01340.
1.5.2. Install tile mock-up for acceptance by Consultant. Accepted mock-up shall form basis of standard of workmanship for remainder of work.
1.5.3. Install each product and colour mock-up for acceptance by Consultant. Accepted mock-up shall form basis of standard of workmanship for remainder of work. Mock-up shall consist of floor/wall/wall corner intersection, with 300mm (12") of finish product on each face.

1.6. Maintenance Material

1.6.1. Provide minimum two per cent of each type and colour of tile required for project for maintenance use. Store where directed.
1.6.2. Maintenance material to be of same production run as installed material.
1.6.3. Submit maintenance instructions for Project Data Book as specified in Section 017300.

1.7. Job Conditions

1.7.1. Environmental Conditions: Execute Work of this Section while temperature is maintained within safe working temperatures as per manufacturer's installation instructions for a period of 72 hours before commencement, during and following installation. Avoid concentrated or irregular heating during curing period.
1.7.2. Protection: Protect Work of this Section against damage by other trades for min. 72 hours after application of grouting by prohibiting passage of traffic over tile. Do not immerse in water and protect tile work from freezing for at least 28 days after installation.

1.8. Warranty

Warrant labour, materials and workmanship against defects and deficiencies for a period of two years from date of Substantial Performance of the Work.

2. PRODUCTS

2.1. Floor and Wall Tile

2.1.1. Ceramic tile; (CT-1): to CAN/CGSB-75.1-M88," Omnia- Matte "code # ZC.OM.Bot.1212.MT as distributed by Olympia Tile, Tel: 416-785-6666, or approved alternative.
2.1.1.1. Size: 305mm (12") x 610mm (24") x 6mm (1/4”).

2.1.1.2. Colour: Botticino (Beige).
2.1.1.3. Tile trim: polished aluminum cover trim to all exposed ceramic tile edges.

2.2. **Mortar and Adhesive Materials**
2.2.1. Water: clean and free of chemicals detrimental to mortar and grout mixes.
2.2.2. Sand: to ASTM C144-97, passing 16 mesh.
2.2.3. Cement: to CAN/CSA-A5/A8/A362-93, Type 10.
2.2.4. Setting Adhesives:
2.2.4.1. Colour: grey typical, white for translucent tile.
2.2.4.2. Typical: Portland cement/sand/latex mixture, to ANSI A118.4-1999 and with minimum Shear Bond (Porcelain Tile, immersion and dry 28 day cure tests) of 2.3 MPa (340 psi) when tested to ANSI A118.4-1999.
2.2.4.2.1. Laticrete 'Laticrete 4237 Latex Thin Set Liquid' with 'Portland 211 Crete Filler Powder'.
2.2.4.2.2. Mapei 'KERALASTIC' mixed with 'KERABOND'.
2.2.4.2.3. TEC Specialty Products, Inc. 'Super Flex Latex-Modified Thin Set Mortar'.
2.2.5. Grouts; typical:
2.2.5.1. Polymer-modified, latex-modified, non-shrink, efflorescence-free, ANSI A118.6.
2.2.5.2. Mapei 'ULTRA/COLOR'.
2.2.5.3. Mapei 'KER 200 Series'.
2.2.5.4. Laticrete '500 Series' mixed with '1776 Grout Admix'.
2.2.5.5. Grout colours: as selected by Consultant, to suit each tile product and colour.
2.2.6. Floor levelling and repair compound: "Ultra/Plan" High Compressive Strength Self-Levelling Underlayment and manufactured by Mapei.
2.2.7. Sealant: in accordance with Section - Sealants, colour selected by Consultant.

3. **EXECUTION**
3.1. **Examination**
3.1.1. Ensure compatibility of products supplied under this Section, and which bear contact with substrate.
3.1.2. Before work commences, examine the areas to be covered and report any flaw or adverse conditions in writing to the General Contractor and the Consultant. Do not proceed with the tilework until surfaces and conditions comply with the requirements indicated in the manufacturer's instructions and in ANSI A108.5 specification.
3.1.3. Miscalibrated tiles, tiles with chipped corners, tiles with holes, will not be accepted for installation.
3.1.4. Carefully inspect the tiles for colour variation. Tiles presenting noticeable variations shall be carefully selected, set aside and used in areas where they fit in the pattern homogeneously. Provide for appropriate lighting equipment in addition to existing lighting in the immediate area where the installation is being performed so that any shade differences which are normally very slight can be identified easily.

3.2. **Preparation**
3.2.1. Wall Surfaces:
3.2.1.1. Roughen previously painted surfaces having hard glossy finish by sandpaper or other abrasive medium, and completely remove finishes which are not compatible with compounds specified under this Section, and which are to be in contact with such objectionable finishes.
3.2.1.2. Remove all foreign matter such as loose mortar, plaster, visible laitance, cement, form release agents, dust and the like which would otherwise impede bonding of levelling coat or mortars.
3.2.1.3. Prime very dry gypsum, wood or porous concrete with primer, brush or roller applied at full strength in accordance with adhesive manufacturer's recommendations.

3.2.2. Floor Surfaces:

3.2.2.1. Completely remove oil, grease, waste from floor areas scheduled to receive new ceramic tile.

3.2.2.2. Mechanically or chemically (trisodium phosphate or similar) remove all paints, adhesives or other previously applied compounds to expose clean surface of existing concrete substrate. Do not use any acids.

3.2.2.3. Levelling Underlayment: Where substrate varies beyond limitations as set forth hereinafter, prime substrate, mix and apply underlayment in accordance with manufacturer's instructions.

3.2.2.4. Concrete shall be minimum of 28 days old.

3.2.2.5. Wire brush steel substrates to remove deleterious substances and rust, to promote full adhesion to steel.

3.2.2.6. Provide levelling/repair coat as applicable, using floor levelling and repair compound, where required to bring surfaces to true even plane within 1:1000. Mechanically scarify very smooth concrete. Where concrete substrate is excessively dry, porous concrete, keep the concrete substrate continuously moist for at least 24 hour before underlayment/repair work commences. Remove excess water allowing the surface to become almost dry before installing floor levelling and repair compound. Allow levelling coat to completely cure prior to installation of tile finish.

3.2.3. Mixing:

3.2.3.1. General: Mix mortars, additives and grouts in strict accordance with manufacturer's requirements.

3.2.3.2. Rotating Blade Mechanical Mixer: Pour latex additive, start mixer and add sand first, followed by Portland cement. Mix no mortar in same mixer as a dissimilar type of mortar unless the mixer is first thoroughly washed clean.

3.2.3.3. Pail Batch Mixing with Low Revolution Drill Mixers as follows:

3.2.3.3.1. Premix separately prior to adding to the latex additive.

3.2.3.3.2. Pour latex additive into clean mixing vessel and add dry materials slowly while mixing into a homogeneous and smooth consistency.

3.3. **Installation - General**

3.3.1. Install all products in accordance with manufacturer's specifications and as indicated herein.

3.3.2. Install tile in accordance with TTMAC specification guide and otherwise in accordance with ANSI A108.5, and ANSI 108.10.

3.3.3. Lay out tile Work so tiles less than 1/2 the least dimension do not occur and with minimum amount of cutting.

3.3.4. Set tile flat and level with uniform joints throughout, properly aligned. Provide uniform slopes to floor drains.

3.4. **Setting**

3.4.1. Place as much tile as possible in one operation before setting bed reaches initial set. Clean back and remove bed when it has set before tile is laid.

3.4.2. Prime materials and by methods specified by manufacturer of bond coat.

3.4.3. Except where tiles have setting tabs, and except for expansion, control and isolation joints, maintain joint widths as selected by Consultant.

3.4.4. Back up tile coves, curbs and other shaped pieces solid with mortar. Rigidly set, reinforce or otherwise make firm and secure such pieces.

3.4.5. Beat tiles in thoroughly and sufficiently to cause mortar ribs or notches to come together into a continuous void free bed and allow the mortar to flow up partially into the joint space to approximately 1/3 the thickness of the tile.

3.4.6. Remove any excess setting material from the joint area so that 2/3 of the depth of the tile is available for grouting.

3.4.7. Remove smudges or smears of setting material from the tile surface with a damp sponge or cloth immediately after final adjustment and beat-in while the mortar is fresh.
3.4.8. Do necessary cutting and drilling of fixtures, fittings, and built-in or penetrating units without marring the tile. Replace all cracked or damaged tile.
3.4.9. Form external angles with round edge tile extending over edge of square edge adjacent tile. Internal angles shall be formed square, carrying 1 flat tile past edge of other.
3.4.10. Extend tile into recesses at windows, doors, or other openings.
3.4.11. Extend tiles behind mirrors, cabinets, cupboards and other fixed objects at walls.
3.4.12. Cut tiles to conform with irregularities in wall lines and vertical planes along outer edges. Smooth cut edges with carborundum block or by other means to provide clean straight edge.

3.5. **Thin-set Mortar System**
3.5.1. Perform surface preparation, mixing and application in accordance with manufacturer's instructions. Apply mortar over flat surfaces using notched tooth trowel to produce a bed of approximately 3mm (1/8") to 6mm (1/4") in thickness.
3.5.2. Do not dampen tile set in adhesive.
3.5.3. Tap tile firmly into position sufficiently to obtain minimum 100 per cent positive contact. Adjust tile before initial set takes place.
3.5.4. In addition to setting bed material, use setting material to fully back butter tile all tile larger than 250mm (10") x 250mm (10") prior to setting into adhesive.

3.6. **Application of Adhesive**
3.6.1. Keep tiling materials, room and adhesive at a minimum 50F (10° C) or above for 24 hours before and 48 hours after installation.
3.6.2. Pre-measure and pre-cut tile prior to spreading adhesive.
3.6.3. Apply adhesive to substrate with pressure using the flat side for the trowel to promote a good mechanical bond.
3.6.4. Comb surface using a 5/32" (4mm) V-notch trowel to attain an even setting bed.
3.6.5. Press or twist tile into adhesive, using care to maintain accurate joint alignment and spacing.
3.6.6. Beat in tiles with a rubber faced beating block to promote 100 per cent coverage of tiles with adhesive, and to avoid air pockets under the tiles.
3.6.7. Attain a minimum 1/32" (0.8mm) continuous layer of mastic between tile and substrate, after beat-in.
3.6.8. Apply tiles within 1 to 1-1/2 hours after spreading adhesive.
3.6.9. Do not set tiles after a skin has formed on the adhesive, scrape off dried material and apply fresh adhesive.

3.7. **Grouting**
3.7.1. Apply grout in strict accordance with manufacturer's printed instructions.
3.7.2. Allow sufficient time after installation of tile units, before grouting unless otherwise recommended by manufacturer. Wait minimum time of 24 hours for Keralastic and 48 hours for Keracrete.
3.7.3. Force grout into joints for full depth, level with surface of tile. Scrape surplus grout from surface of tile thoroughly and quickly. After grout has attained slight initial set, completely clean up and polish surfaces of tile.
3.7.4. Grout joint width to be 3mm (1/8"), typically.
3.7.5. Use caution when using sanded grouts to prevent scratching of tile surface.

3.8. **Protection and Clean-Up**
3.8.1. Allow minimum twenty-four (24) hours after installation of tiles, before grouting unless otherwise recommended by manufacturer.
3.8.2. Clean installed tile surfaces after installation and grouting cured.

3.8.3. Re-point joints after cleaning to eliminate imperfections. Avoid scratching tile surfaces.

END OF SECTION

1. GENERAL

1.1 General Instructions

Read and be governed by the Contract and Sections of Division 1.

1.2 Related Sections

1.2.1 Metal support systems for gypsum board - under Section 092200.
1.2.2 Gypsum board - under Section 092116.
1.2.3 Air supply diffusers and air return grilles - under Division 23.
1.2.4 Lighting support - under Division 26.

1.3 Quality Assurance

1.3.1 Installer Qualifications: Engage an experienced Installer who has successfully completed acoustical ceilings similar in material, design, and extent to those indicated for Project.
1.3.2 Single Source Responsibility: Obtain each type of acoustical ceiling unit and suspension system from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
1.3.3 Coordination of Work: coordinate layout and installation of acoustic ceiling units and suspension systems components with other work supported by or penetrating through ceilings, including light fixtures, HVAC equipment, partition system and fire suppression system components.

1.4 References

1.4.1 ASTM C635, Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
1.4.2 ASTM C636, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
1.4.3 ASTM E119, Standard Methods of Fire Tests of Building Construction and Materials.
1.4.4 CISCA Ceiling Systems Installation Handbook.

1.5 Deflection Criteria

Maximum deflection: 1/360th of span to ASTM C635 deflection test.

1.6 Submittals

1.6.1 Samples:
.1 Submit sample of each component of ceiling system to the Consultant for review in accordance with Section 013323. Samples shall fully represent materials to be supplied in colour, texture, finish and construction.
.2 Submit samples, load test data and design tables for each type of insert to be used on Project for hanger supports.

1.6.2 Shop Drawings:
.1 Submit manufacturer's standard details.
.2 Submit shop drawing in accordance with Section 013323.
.3 Submit reflected ceiling plans for special grid patterns as indicated.

1.6.3 Manufacturer's Data: Submit manufacturer's specifications and installation instructions for each acoustical material, suspension system and other products required, including certified laboratory test reports and other data as may be required to show compliance with the Documents.
1.6.4 Data Manual: Provide maintenance and cleaning instructions for acoustical ceilings according to Data Manuals Section 017300.

1.7 Mock-Ups

1.7.1 Erect mock-up in accordance with Section 013323.
1.7.2 Construct in locations acceptable to Consultant a typical sample installation. Modify sample as directed and as required to obtain approval. Upon acceptance retain sample as standard of quality for acoustical ceiling.

1.7.3 Do not begin fabrication and erection of remainder of ceiling system until sample installation has been reviewed and accepted. Accepted sample to become a part of final work.

1.7.4 Indicate lay-out, insert and hanger spacing and fastening details, splicing method for main and cross runners, location of access splines and acoustical unit support at ceiling fixture.

1.8 **Certificate of Compliance**

1.8.1 Provide certificate of compliance ensuring that the suspension system provided, including materials and installation, comply with this Section.

1.9 **Data Manual**

1.9.1 Provide maintenance and cleaning instructions for acoustical ceilings according to Data Manuals Section 017300.

1.10 **Maintenance Materials**

1.10.1 Deliver for maintenance use, each type and colour of suspension components and acoustical panels amounting to 2 per cent of gross ceiling area of Project.

1.10.2 Deliver hangers for maintenance use amounting to 2 per cent of gross Basketweave ceiling area of Project.

1.10.3 Pack panels in suitably clearly identified and dated containers and store where directed by Owner.

1.11 **Delivery, Storage, and Handling**

1.11.1 Ship exposed members and mouldings in rigid crates to avoid damage. Bent or deformed material shall be rejected. Baked enameled members shall be suitably wrapped and protected against damage.

1.11.2 Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

1.11.3 Before installing acoustical ceiling units, permit them to reach room temperature and stabilized moisture content.

1.11.4 Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

1.12 **Environmental Requirements**

1.12.1 Commence installation after building is enclosed with windows and exterior doors in place and glazed, and roof watertight.

1.12.2 Interior temperature of building to range from 15 degrees Celsius to 30 degrees Celsius and relative humidity of not more than 70 per cent before and during installation.

1.13 **Design**

1.13.1 Design suspension system to support safely, and without distortion, the superimposed loads of:

.1 Lighting fixtures;

.2 Air supply diffusers and return grilles;

1.13.2 Coordinate installation and cooperate with Mechanical and Electrical Subcontractors, to accommodate mechanical and electrical items, or any other Work required to be incorporated in or coordinated with the ceiling system.

2. **PRODUCTS**

2.1. **Acoustical Materials**

2.1.1. Lay-In Acoustical Panels:

2.1.1.1. Size: 610mm (24") x 610mm (24") x 16mm (5/8") nominal

2.1.1.2. Material: Mineral Fiber, Wet-formed

2.1.1.3. Pattern: Cortega, #704, White

2.1.1.4. Edge: Angled tegular

2.1.1.5. Finish: Factory applied, vinyl latex paint coating

2.1.1.6. NRC: 0.55

2.1.1.7. CAC: 33
2.1.1.8. Light reflectance: 0.82
2.1.1.9. ASTM Classification: Type III, Form 2
2.1.1.10. Flame Spread: 25 or under to ASTM E1264
2.1.1.11. Lay-in panels meeting the above specifications, by Armstrong World Industries Ltd. or approved equal

2.1.2. Metal Suspension Systems

2.1.3. Concrete hanger anchors; post installed: Steel eye bolts and nuts to suit ceiling hangers with capability to sustain, without failure, a load equal to 4 times that imposed by ceiling construction, as determined by testing per ASTM E 488, conducted by a qualified independent testing laboratory.
2.1.3.1. Dynabolt Sleeve Anchor 'TW-1614' or Readi-Tie-Drive 'TD4-112' tie wire anchor by ITW Ramset/Red Head.
2.1.3.2. Kwik-Bolt II 'HCKB 1/4' tie wire anchor by Hilti Corporation.
2.1.3.3. Fasteners exposed to weather, condensation, and corrosion: Zinc-plated or stainless steel fasteners in applicable product lines specified in preceding paragraphs.

2.1.4. Powder Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated fabricated from corrosion-resistant materials, with clips or other accessory devices for attachment of hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing laboratory.

2.1.5. Hangers for Direct Suspension: Galvanized wire, recommended by manufacturer of suspension system, minimum 2.66mm (12 gauge).

2.1.6. Hanger Supports: Inserts shall be certified type for setting in concrete or self-drilling expansion inserts for placing afterward. "Tie-Wire Anchor" by Hilti Corp. is acceptable.

2.1.7. Tie Wire: 1.519mm (0.06"), galvanized steel wire.

2.1.8. Suspension System Accessories:
2.1.8.1. Splices, clips, and perimeter moulding, of manufacturer's standard type to suit the applicable conditions unless special conditions and access areas are shown or specified.

2.1.9. Metal Finish: Metal exposed in finished Work shall have a precoated baked enamel finish in non-yellowing, Flat White. Provide paint formulation of grid system to lighting fixture, speaker grille, sprinkler and diffuser manufacturers to ensure consistency of colour, sheen and texture of all exposed metal components in the ceiling assemblies.

2.1.10. Suspension (standard 15/16) system: Intermediate duty to ASTM C635, interlocking tee system, designed to support acoustical panels in patterns indicated, consisting of main tees and cross tees. System shall be "Lance-Lock 24mm(15/16") exposed tee system grid system manufactured by Bailey Metal Products Limited, "Donn DX" system by CGC Interiors, or "Prelude 15/16" by Armstrong World Industries. The system shall provide lock joint intersections of cross and main tees.

2.2. **Miscellaneous Materials**

2.2.1. Acoustical Sealant: Nondrying, non-hardening, non-skinning, non-staining, non-bleeding, gunnable sealant complying with requirements specified in Division 7 - Joint Sealers.

3. EXECUTION

3.1. **Installation General**

3.1.1. Do not start installation until exterior glazing has been completed and exterior openings are closed in. Ensure wet Work is completed and dried out to a degree acceptable to panel manufacturer before installation is commenced. Maintain uniform temperatures of at least 16°C for 72 hours prior to commencement of Work and maintain temperature until completion.

3.1.2. Install ceiling panels and metal suspension system in accordance with manufacturer's directions. Where manufacturer's directions are at variance with Contract Documents, notify Consultant before proceeding with Work.

3.1.3. Do not commence installation until all Work above suspended ceiling has been completed, inspected and accepted.

3.2. **Installation Suspension System**

3.2.1. Install finished Work rigid, secure, square, level and plumb, framed and erected to maintain dimensions and contours indicated' in accordance with ASTM C636, CISCA installation standards and any other applicable national or local code requirements. Make allowance for thermal and structural movement.

3.2.2. Attach hangers to structure with inserts and hanger supports. Do not use powder activated fasteners.

3.2.3. Support hangers for suspended ceiling grid independent of walls, columns, pipes and ducts.

3.2.4. Space hangers for ceilings at maximum 1220mm (48") oc in both directions. Provide additional hangers as required.

3.2.5. Locate hangers at not more than 150mm (6") from ends of main tee members.

3.2.6. Erect suspension systems at required heights and water tube, transit or laser beam level to tolerance of 1:1200.

3.2.7. Allowable tolerances: to ASTM C636.

3.2.8. Design suspension systems for a maximum mid-span deflection not exceeding 1/360th of span.

3.2.9. Install exposed tee members to pattern indicated. Securely attach hangers to main tee members.

3.2.10. Exposed tees shall be as long as possible to minimize joints. Make joints square, tight, flush and reinforce with splines. Distribute joints to prevent clustering in one area.

3.2.11. Space tee bars to suit ceiling panels and as detailed, and to accommodate lighting fixtures, diffusers and return grilles.

3.2.12. Cooperate in the installation of ceiling systems, making adjustments where required to ensure that the lighting fixtures, supply diffusers, exhaust grilles and other built-in items properly fit into ceiling module and finish flush with rest of ceiling.

3.2.13. Restrict creep inside module panels so that in all cases strips are centred on module lines.

3.2.14. Install edge moulding as detailed where ceiling abuts vertical surfaces. Mitre all corners, use maximum lengths to minimize joints. Make joints square, tight and flush.

3.2.14.1. Apply continuous ribbon of acoustical sealant, concealed on back of vertical leg before installing mouldings.

3.2.14.2. Screw attach mouldings to substrates at intervals not more than 400 mm (16") o.c. and not more than 210 mm (8") from ends, leveling with suspension system to tolerance of 3 mm in 3660 mm (1/8" in 12'-0"). Miter corners accurately and connect securely.

3.3. **Installation Tiles**

3.3.1. Take precautions during installation to ensure tile edges are not chipped or otherwise damaged.

3.3.2. Install acoustical tiles to form horizontal and level ceiling with all parts flush and joints butted tightly to hairline appearance.

3.3.3. Distribute variations in colour and texture of panels to obtain a uniform appearance.

3.3.4. At tegular edge acoustic tile ceiling areas, field-tegularize cut tile edges. Match factory cut tegular edge, in configurations and colour.

3.4. **Cleaning and Completion**

3.4.1. Carefully examine Work on completion and replace uneven or defective materials, eliminate all waves, remedy damaged exposed finished surfaces and remove soiled or stained areas.

3.4.2. Clean soiled surfaces to manufacturer's recommendations.

END OF SECTION

1. **GENERAL**

1.1 **General Instructions**

Read and be governed by Conditions of the Contract and Sections of Division 1.

1.2 **Related Sections**

1.2.1 Resilient Safety Flooring - under Section 096516

1.2.2 Sheet Linoleum Flooring - under Section 096543

1.3 **Submittals**

1.3.1 Samples: Further to requirements of Section 013400, submit three, 305mm (12") long samples of each colour and type of base material. Include outside corner of base.

1.3.2 Mock-up: Provide inside and outside corner mock-ups plus 30m of straight run in accordance with Section 013400.

1.3.3 Data Manual: Provide maintenance instructions according to Data Manuals Section 017300.

1.3.4 Temperature of room and materials shall be at least 21°C for 24 hours before, during and seven days after the tile installation.

2. **PRODUCTS**

2.1. **Materials**

2.1.1. Resilient base (RB): Extruded rubber cove base, 100mm (4") x 3mm (1/8") solid colour, by Johnsonite or Amtico.

1.3.4.1 Colour: '80 Fawn' by Johnsonite or 'RB115' by Amtico.

2.1.2. Adhesive; porous surfaces: Johnsonite #960 acrylic cove base adhesive.

2.1.3. Adhesive; nonporous surfaces: Johnsonite #945 contact bond adhesive.

2.1.4. Block Wall Filler: Latex filler, "S-180" by Armstrong Cork Canada Ltd., or "Planicrete 20" by Mapei Canada Ltd., "87 Latex Underlayment" by Flextile Ltd. or waterproof filler recommended by flooring manufacturer.

3. **EXECUTION**

3.1. **Examination**

3.1.1. Examine substrate to ensure clean lines, correct level and freedom from cracks, ridges, dusting, scaling and carbonation.

3.1.2. Examine walls in advance of application of base to ensure that surfaces are protected against entry of water and moisture. Perform compatibility test with primer/adhesive and substrate.

3.2. **Installation of Base**

3.2.1. Allow coiled wall base to lay flat for at least 24 hours at 21°C (70°F) prior to installation.

3.2.2. Spread adhesive to the ribbed surface (back) of the wall base with a 3mm (1/8") square-notched trowel; allow slight set-up, then bring base into contact. Ensure full and secure adhesion of base to substrate. The adhesive should cover 80 per cent of the back surface. Leave a 6mm (1/4") uncovered space at the top of the wall base to prevent the adhesive from oozing onto the wall above the base when installed.

3.2.3. Position wall base on wall surface and roll with hand roller. Always roll back to starting point to prevent stretching the wall base.

3.2.4. Set base to ensure installation over finished flooring material is free of gaps.

3.2.5. Install base in longest lengths possible. Adhere toe of base to substrate, and ensure edge of toe is straight.

3.2.6. Install straight and level to variation of 1:1000.

3.2.7. At outside corners apply epoxy adhesive and chamfer. Round off with fine grade sandpaper. Remove any scratches or scuffs with paste wax.

3.2.8. Install base to substrate as scheduled and/or detailed and in accordance with manufacturer's recommendations.

3.2.9. Ensure that substrate is solid and free of voids, gaps, or other defects which will preclude adequate adhesion, or will ghost or telegraph through finished base installation.

3.2.10. Scribe and fit to door frames and other obstructions.

3.2.11. Joints shall be tightly fitted, straight and vertical, and not less than 610mm (24") from corners.

3.2.12. Provide joints in base over substrate control joints.

3.2.13. Field-made inside corners:

3.2.13.1. Install wall base and terminate into the corner.

3.2.13.2. Position another piece of wall base on opposing wall, without adhesive, approximately 25mm (1") from the installed piece.

3.2.13.3. Utilizing the dividers, place the hooked end at the top of the installed piece and the pointer end on the top of the uninstalled piece. Carefully, move the dividers downward in a straight vertical motion, allowing the hooked end of the dividers to follow the profile of the installed piece. At the same time, place adequate pressure on the pointer end to transfer and/or scribe the profile onto the surface of the uninstalled piece.

3.2.13.4. Use a utility knife to cut the pattern on the uninstalled wall base, apply adhesive, and position the trimmed section into place.

3.2.14. Field-made outside corners:

3.2.14.1. Stop application of adhesive to wall base approximately 450mm (18") from the outside corner of the wall.

3.2.14.2. Position the wall base at the corner and pencil line the back of the wall base where the bend is desired.

3.2.14.3. Lay the wall base on the floor with the backup. Utilizing a top-set or pull-type gouge tool, make a shallow notch along the pencil line.

3.2.14.4. Notch depth should not exceed one-quarter the total thickness of the wall base.

3.2.14.5. Reposition the wall base corner on the wall. The corner of the wall should fit snugly into the notched recess on the back of the wall base.

3.2.14.6. Apply adhesive and roll firmly into place.

3.2.15. Cope mitre internal corners. Wrap external corners by grooving back of base (using special tool, knive cutting prohibited) to produce tight corner without separation to wall.

3.2.16. At outside corners apply epoxy adhesive and chamfer. Round off with fine grade sandpaper. Remove any scratches or scuffs with paste wax.

3.2.17. Apply bases to walls, partitions, columns, furniture and fitments, including free-standing units.

3.2.18. Bases are required at all millwork installations regardless of floor finish.

3.3. **Cleaning**

3.3.1. Remove any excessive adhesive from surfaces of the base as Work progresses. Remove wet adhesive with a water dampened cloth. If adhesive has dried, use a cloth dampened with mineral spirits.

3.3.2. Wash surfaces using non-phosphate detergent to remove all silicone, wax, dirt and dust using rotary scrubbing machines fitted with nylon brushes. Wash with neutral mild detergent and water, thoroughly buff dry with smooth wool pad. Do not apply any other compounds.

END OF SECTION

1. GENERAL

1.1 General Instructions

1.1.1 Read and be governed by Conditions of the Contract and Sections of Division 1.

1.2 Related Work

1.2.1 Ceramic tile - under Section 093013
1.2.2 Resilient Accessories - under Section 096513
1.2.3 Sheet Linoleum Flooring - under Section 096543
1.2.4 Floor access covers - under Division 22.

1.3 Samples

1.3.1 Submit duplicate 914mm (36") long samples of finish flooring strips in accordance with Section 013323.

1.4 Maintenance Data

1.4.1 Provide maintenance data for floor finish and care for incorporation into manual specified in Section 017300 - Operation and Maintenance Manual.

1.5 Quality Assurance

1.5.1 Execute work this Section only by a Subcontractor who has adequate equipment and skilled tradespeople to perform it expeditiously , and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past 10 years.

1.6 Affidavits

1.6.1 Submit for approval a list of installation materials intended for use with each flooring material and for each sub floor condition, before installation commences. Accompany the list with an affidavit stating that the manufacturer of each material recommends and approves of its use in each case.

1.7 Delivery and Storage

1.7.1 Store materials in fully enclosed ventilated, clean and dry storage space in areas of installation for minimum of 72 hours prior to commencing of work.

1.8 Environmental Requirements

1.8.1 Install Laminate flooring only on surfaces that are dry (maximum 605 RH @ 18^{o}C)
1.8.2 Substrate surfaces should be level (2mm maximum variation over 1000mm)
1.8.3 Store Wood Laminate flooring flat and in unopened packages at normal room temperature for at list 48 hours prior to installation.

1.9 Warranty

1.9.1 Warrant labour, materials and workmanship against defects and deficiencies for a period of two (2) years from date of Substantial Performance of the Work.

2. PRODUCTS

2.1. Materials

2.1.1. Amtico, Mirra Wood No. WP0004, 4”x36”x1/8 (102x914x3mm)
2.1.2. Cementitious underlayment: Mapei Inc. "Plani-Patch" or alternative as recommended by flooring manufacturer.
2.1.3. Installation materials: Comply with manufacturer's printed installation instructions.

3. EXECUTION

3.1. Examination

3.1.1. Ensure concrete floors are dry, by using test methods recommended by flooring manufacturer, and exhibit negative alkalinity, carbonization or dusting.
3.1.2. Ensure that environmental conditions have been provided as requested and specified.

3.1.3. Ensure that subfloors have been provided as specified without holes, protrusions, cracks greater than 1.6mm (0.06") wide, unfilled control joints, depressions greater than 3mm (1/8") deep, or other major defects.

3.1.4. Defective Work resulting from application to unsatisfactory surfaces will be considered the responsibility of those performing the Work of this Section.

3.2. **Sub-floor Treatment**

3.2.1. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor cementitious underlayment.

3.2.2. Inspect and install for smooth transition from other floor finishes to this flooring material.

3.2.3. Dry vacuum entire floor area immediately prior to application of adhesive.

3.2.4. Remove chalking and dusting from concrete surfaces with wire brushes.

3.3. **Installation**

3.3.1. Install polyethylene underlay, lapped joints of 200mm.

3.3.2. Allow for 5-8mm expansion joints at all wall junctions.

3.3.3. Install flooring in lengths parallel to room length.

3.3.4. Ensure end joints are overlapped a minimum 200mm.

3.3.5. Assemble using tapped on fold down method.

3.4. **Finish Flooring**

3.4.1. Comply with manufacturer's and distributor's installation instructions.

3.4.2. Maintain expansion space at perimeter of floor surface.

3.4.3. Install transition strips at adjacent floor finishes.

3.4.4. Contractor responsible for all cleaning and any final adjustments prior to living site. Final inspection to be conducted by the Owner, Consultant and Contractor.

3.5. **Protection**

3.5.1. After materials have set, and until completion, coordinate the Work to ensure that floors are not damaged by traffic.

3.5.2. At completion of flooring installation, install floor protection in areas where other work and traffic will occur. Lap joints of material of 150mm to be sealed with non-asphaltic tape.

END OF SECTION

1. GENERAL

1.1 General Instructions

Read and be governed by the Contract and Sections of Division 1.

1.2 Related Sections

1.2.1 Resilient Safety Flooring - under Section 096516
1.2.2 Resilient Accessories - under Section 096513
1.2.3 Floor access covers - under Division 22.

1.3 Quality Assurance

1.3.1 Execute Work of this Section only by a Subcontractor who has adequate equipment and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past five years.

1.3.2 Flooring shall be installed by manufacturer's certified installers. Submit current installer's certificates prior to commencement of work.

1.4 Samples

Submit resilient flooring and base in accordance with Section 01332.

1.5 Maintenance Data

Provide data for maintenance of resilient flooring for incorporation into Maintenance Manual specified in Section 017300.

1.6 Maintenance Materials

1.6.1 Deliver 2 per cent of each colour in full running length, pattern and type flooring material required for this project for maintenance use. Store where directed. Clearly identify each box.

1.6.2 Maintenance materials to be same production run as installed materials.

1.7 Delivery, Storage and Handling

1.7.1 Package flooring materials and identify contents of each package.

1.7.2 Store materials for a minimum of twenty four (24) hours immediately before installation at no less than 18° C.

1.8 Environmental Requirements

1.8.1 Temperature of room and materials shall be at least 21° C for twenty four (24) hours before, during and seven days after the tile installation. Avoid high humidity and cold drafts.

1.8.2 Provide adequate ventilation during installation.

1.9 Warranty

1.9.1 Submit manufacturer's standard five year warranty from date of Substantial Performance of the Work.

1.9.2 Warrant labour, materials and workmanship against defects and deficiencies for a period of two years from date of Substantial Performance of the Work.

2. PRODUCTS

2.1. Materials

2.1.1. Linoleum sheet flooring; (SF-1): Type I to ASTM F 2034, all natural ingredients 2.0mm (0.079") thick.

2.1.1.1. Product: Marmoleum ‘Real Contractor Plus’ as manufactured by Forbo-Kromennie.

2.1.1.2. Width: 1981mm (6’-6”).

2.1.1.3. Colour: To be determined by consultant.

2.1.2. Primers and adhesives: as recommended and manufactured linoleum sheet flooring manufacturer.

2.1.3. Sub-floor filler: as recommended by linoleum sheet flooring manufacturer.

2.1.4. Seaming system: heat welding rod system as manufactured linoleum manufacturer. Provide colours as selected by Consultant.

2.1.5. Sealer and polish: institutional grade as approved by manufacturer.

3. EXECUTION

3.1. Examination

3.1.1. Examine substrate to ensure clean lines, correct level and freedom from cracks, ridges, dusting, scaling and carbonation.

3.1.2. Examine floors in advance of application of flooring to ensure that floors are protected against entry of water and moisture. Perform compatibility test with primer/adhesive and substrate.

3.1.3. This Section shall call upon the services of an accredited laboratory, at its own expense, to test to moisture content of concrete slabs to be covered. Maximum percentage of moisture acceptable is 1.6 kg/92.9 m (3.5 lbs/1000 ft) in a 24 hour period. Submit moisture test reports to Consultant.

3.1.3.1. Acceptable test method: Calcium Chloride Test to ASTM F 1869.

3.1.4. Minimum curing/drying time for new concrete slabs; sixty (60) days.

3.1.5. Minimum compressive strength of floor substrate 25 MPa (3500 psi).

3.2. Sub-floor Treatment

3.2.1. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

3.2.2. Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured.

3.2.3. Remove chalking and dusting from concrete surfaces with wire brushes.

3.2.4. Remove prime paint and wire brush steel surfaces.

3.2.5. Prime or seal concrete to flooring manufacturer's recommendations.

3.3. Flooring Application

3.3.1. Apply adhesive uniformly and install flooring in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.

3.3.2. Do not reverse alternative sheets.

3.3.3. As installation progresses, roll flooring with 68 kg (150 lbs) roller to ensure full adhesion, free of adhesive ridges.

3.3.4. Cut and fit neatly around fixed or excessively heavy objects.

3.3.5. Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.

3.3.6. Install rubber strips at unprotected or exposed edges where flooring terminates.

3.3.7. Flooring installation shall not show unsightly telegraphing of substrate. Flooring installation shall be homogenous free of substrate lines, pockets, bumps and unevenness.

3.4. Adjustment, Cleaning and Sealing

3.4.1. Replace defective Work so that there is no discernible variation in appearance between installed and replaced materials.

3.4.2. Remove excess adhesive from floor surfaces without damage.

3.4.3. Scrub the floor with lukewarm water to which a neutral cleaning agent (ph between 5 & 9) has been added (such as Duoclean by Forbo Industries or an approved equal).

3.4.4. Mop up or wet vacuum the dirty water.

3.4.5. Rinse floor with clean water, wet vacuum and let dry.

3.5. Protection

3.5.1. Protect new floors from time of final set of adhesive until final inspection.

3.5.2. Prohibit traffic on floor for forty eight (48) hours after installation.

3.5.3. Install floor protection in areas where other Work, repairs and installation of equipment, and foot traffic will occur.

END OF SECTION

1. **GENERAL**

1.1. **General Instructions**

Read and be governed by the Contract and Sections of Division 1

1.2. **Extent of Work**

1.2.1. Paint and finish all "paintable" new and existing interior and exterior surfaces indicated on Drawings except those exempt by Specifications or Drawings.

1.2.2. The following surfaces are considered "non-paintable" for purposes of this Contract. Omit painter's finishes from following items:

1.2.2.1. Any material and equipment furnished completely prime and finish painted by manufacturer;

1.2.2.2. Internal surfaces of steel tanks and stacks;

1.2.2.3. Sprayed fire-resistant materials;

1.2.2.4. Exterior concrete including building walls, building floors and pavements, except as otherwise scheduled.

1.2.2.5. Stainless steel, weathering steel, copper, bronze, chromium plate, nickel, anodized or lacquered aluminum, monel metal;

1.2.2.6. Exposed insulation, slate, glass, plastic, brick, resilient floors, treads and bases, ceramic tile and hardware;

1.2.2.7. Prefinished metals, unless required to be colour coded.

1.2.2.8. Spray textured gypsum board;

1.2.2.9. Metallic and mastic insulation finishes;

1.2.2.10. Abrasive material finishes on floors, stair treads, stair nosings and landings;

1.2.2.11. Insulated electric cables;

1.2.2.12. Machined parts of machinery and equipment.

1.3. **Quality Assurance**

1.3.1. Qualification of Manufacturer: The paint products of the paint manufacturer shall be as listed in the association manual, latest edition, under "Paint Product Recommendation" section, premium grade.

1.3.2. Qualifications of Applicators: Contractors shall have minimum of five (5) years proven satisfactory painting experience of projects of similar size and class subject to the Consultant's approval. Representative shall be thoroughly conversant with the requirements of the specification, schedules, drawings and Ontario Painting Contractor's Association Architectural Painting Specification Manual.

1.3.3. Association Manual: Provide copy of Ontario Painting Contractor's Association Architectural Painting Specification Manual, latest edition, and maintain one copy at site office for reference.

1.3.4. Conform to OPCA Manual, latest edition.

1.4. **Submittals**

1.4.1. Submit submittals in accordance with Section 013323.

1.4.2. Colours:

1.4.2.1. Paint colours will be selected by Consultant, as noted in Finish Schedule.

1.4.2.2. The Consultant shall have complete freedom in choice of colours in compiling colour schedule and will not necessarily select colours from standard colour charts of manufacturer whose products have been approved for use.

1.4.2.3. Colour chart giving colour schemes and gloss values will be prepared by the Consultant after tendering. Final selection of colours of all finishes throughout and whether finishes are transparent (natural) or opaque (paint) shall rest solely with Consultant. Allow for at least 7 colours unless otherwise indicated.

1.4.3. Samples: Submit samples of various finishes for Consultant's approval, at least thirty days before materials are required. Submit samples in triplicate on 200 mm x 305

mm (8"x 12") material of the same type as that on which the coating is to be applied, where possible. Identify each sample as to job, finish, formula, colour name, number, sheen name and gloss values, date and name of contractor. Resubmit as required until colours and gloss value are approved.

1.4.4. List of Materials:

1.4.4.1. Submit name of paint manufacturer proposed for the work and complete list of materials intended for use on work, prepared by paint manufacturer, to the Consultant for approval at least fifteen (15) days before materials are required. Indicate manufacturer's official certification that materials listed thereon are the top quality made by the company unless otherwise indicated herein.

1.5. **Storage, Delivery, Handling and Protection**

1.5.1. Deliver materials to site in sealed original containers with labels intact and store in space directed by the Consultant. Keep stored materials covered at all times. The presence of any unauthorized material or containers for such on the site shall be sufficient cause for rejection of all paint materials on the site at that time.

1.5.2. Exercise extreme caution in the storage of materials to prevent fire or which may create fire hazards. Thinners and solvents shall be stored in CSA approved metal safety containers in accordance with governing fire and safety regulations.

1.5.3. In areas of storage protect floor and wall surfaces from paint drips. Protect floors with sheets or clean plywood or metal pans where mixing is being carried out. Post "No Smoking" signs in areas of storage and mixing and strictly enforce this requirement. Provide and maintain C0 fire extinguishers of minimum 20lb capacity, accessible in storage mixing areas.

1.5.4. Leave storage areas clean and free from evidence of occupancy when these are required for intended use.

1.5.5. Keep waste rags in metal drums containing water and remove from building working shift.

1.6. **Environmental Conditions**

1.6.1. All areas shall be clean and dust free before painting is commenced.

1.6.2. In all areas where interior painting and decorating work is proceeding, provide a minimum of 25 candle power/sq.ft. lighting on the surfaces to be painted.

1.6.3. In all areas where interior painting and decorating work is proceeding, provide adequate continuous ventilation and ensure that there is sufficient heat to maintain temperatures above 15° C for 24 hours before and after paint application.

1.6.4. Do not apply at temperatures below 10° C and relative humidity above 85 per cent.

1.6.5. Make thorough examination of drawings, details and schedules, determine the intent, extent, materials, types of surfaces, locations and be fully cognizant of requirements.

1.6.6. Use sufficient clean drop cloths and protective coverings for full protection of floors, furnishings and work not being painted. Protect mechanical, electrical and special equipment and all other components of building which do not require painting from paint spotting and other soiling during painting process.

1.6.7. Mask adjoining work adjacent to work being painted or carefully cut in without overlaps. Clean surfaces soiled by spillage of paint and paint spatters. If cleaning operations damage the surface, repair or replace damaged work without cost to the Owner.

1.6.8. Do not paint exterior surfaces during or immediately following rain, frost or dew and dusty, windy, foggy weather.

1.6.9. Be responsible for damage to the work of this Section until the building is complete and accepted by the Consultant. In cases of damage, surfaces shall be cleaned and repainted to Consultant's approval.

1.7. **Extra Materials**

Provide two sealed containers, each of four litres (one gallon) capacity of each paint product in each colour used in the work for the Owner's maintenance use. Containers shall be new, clearly labelled with manufacturer's name, type of paint, colour and colour number. Store on site where directed by the Owner.

1.8. **Warranty**

1.8.1. Contractor hereby warrants for period of two years that painting systems shall remain free from failure due to causes including: material failure; surface preparation less than that specified; and paint film thickness less than that specified, or when not specified, less than that coverage recommended by manufacturer.

1.8.2. Presence of any of following shall constitute failure: visible corrosion; film peeling, blistering, checking, scaling, embrittling or general film disintegration; and poor adhesion as determined by tape "peel-off" test procedures.

2. **PRODUCTS**

2.1. **Materials**

2.1.1. Paint and fillers shall be of type and brand herein specified and listed under "Paint Product Recommendations" premium grade as covered in the association manual, latest edition, for specific uses and only as supplied by Pratt & Lambert Co., Benjamin Moore & Co., Para Paints Canada Inc., ICI Paints (Canada) Inc. (Glidden), Sherwin-Williams Canada Inc., PPG, and Colour Your World. Paint materials such as linseed oil, shellac, turpentine, and the like and any of above materials not specifically mentioned herein but required for first-class work with finish specified shall be highest quality product off approved manufacturer. Where specific products are indicated in painting schedule, use product manufacturer as specified.

2.1.2. Provide safe and adequate equipment, scaffolding, ladders, plant, tools, brushes, rollers, clean drop cloths and other items required for the completion of the work.

2.1.3. Ensure the proper use of proprietary materials in strict accordance with manufacturer's directions.

2.1.4. Paint, enamel and stains shall be latex, alkyd and oil base types as scheduled.

2.1.5. Shellac shall be pure white gum dissolved in pure grain alcohol.

2.1.6. Undercoatings and primers shall be made for the purpose by the manufacturer of the finishing materials being used, or as approved by same.

2.1.7. Brushes, rollers, and the like shall be the best of their respective kinds, clean and suitable for the work.

3. **EXECUTION**

3.1. **Conditions of Surfaces**

3.1.1. Prior to commencement of work of this Section, thoroughly examine all surfaces scheduled to be painted. Check all surfaces with electric moisture meter and do not proceed if reading is higher than 12-15 per cent.

3.1.2. Inspect surfaces to be coated for gouges, marks, nibs, and other defects and properly prepare patching, filling, smoothing or other surface preparation necessary to ensure satisfactory finish.

3.1.3. Report in writing any condition adversely affecting this work.

3.1.4. Proceed with work only when surfaces and conditions are satisfactory for production of first-class job. Remove dust, grease, rust, scale and extraneous matter, tool and machine marks and insects from all surfaces which could be detrimental to a satisfactory and acceptable finish.

3.2. **Preparation**

3.2.1. Prepare surfaces in accordance with Chapter 3, "Surface Preparation", and Chapter 8A of the Association Manual, in addition to the following requirements:

3.2.2. Hardware:

3.2.2.1. Remove finish hardware, electric plates and accessories. Mask any that are not removable. Replace when paint is dry and clean them. Do not clean with solvent that will remove permanent finish.

3.2.3. Metal Surfaces; Unpainted and Shop Primed:

3.2.3.1. Clean unpainted and shop primed metal to provide satisfactory surfaces to receive overcoats and provide permanent adhesion of coatings. Remove rust and scale with emery paper and wire brushes. Prime bare metal, make good shop primed metal where abraded, feather out edges to make touch-up patches inconspicuous. Thoroughly clean metal surfaces including piping and ductwork of oil and grease with mineral spirits.

3.2.4. Metal Surfaces; Galvanized:

3.2.4.1. Apply cold phosphate surface treatment to SSPC-PT2-82 to unpassivated zinc-coated metal.

3.2.4.2. For passivated zinc-coated metal ("white rusted"), power wire brush or vigorously hand wire brush to scuff galvanize thoroughly, and solvent clean to SSPC-SP1- 82.

3.2.5. Concrete and Masonry:

3.2.5.1. Thoroughly clean form oil, parting compounds, curing compounds and other incompatible materials from concrete surfaces.

3.2.5.2. Thoroughly clean masonry and concrete surfaces to be painted free of mortar droppings, concrete spotter and extraneous matter.

3.2.5.3. Check concrete and masonry surfaces to be painted for alkalinity with pink litmus paper or other recognized method. Where extreme alkalinity occurs (6.8 - 8.0 range) wash surface with tetrapotassium solution where latex base paint is to be used and with zinc sulphate solution where oil base paints are to be used. Rinse with clean water and allow to dry thoroughly prior to application of primer.

3.2.6. Gypsum Board:

3.2.6.1. Ensure that gypsum board joints are smooth and board is clean and free of any jointing compound spatter.

3.2.6.2. Test surfaces for alkalinity with pink litmus paper or other recognized method.

3.2.7. Previously Painted Surfaces:

3.2.7.1. Deaden previously painted surfaces having hard glossy finish by sandpaper or other abrasive method to ensure adhesion, or treat with purpose-made surface conditioner.

3.2.7.2. Spot prime previously painted and shop primed surfaces which have coating partially removed by blistering, peeling, rupture or scratching, with same primer specified for new surfaces.

3.2.7.3. If more than 25 percent of previous coating has failed or if previous coating can be easily scraped off its substrate, completely remove.

3.2.7.4. Clean previously painted ferrous metal surfaces which are scheduled to be repainted using hand tools.

3.3. **Application**

3.3.1. Apply interior and exterior finishes to all surfaces scheduled to be finished. Finishes shall be free of defects in materials and workmanship affecting appearance and performance. Defects shall include but not be limited to improper cleaning and preparation of surfaces, entrapped dust and dirt, alligatoring, blisters, peeling, drips, runs, uneven coverage, misses, poor cutting in, improper use or application of materials.

3.3.2. Paint shall be applied by means of brushes except for wall and ceiling surfaces on which the paint shall be applied by rollers. Varnish shall be brushed. Spray painting will be permitted in areas where exposed decks and structure are scheduled to be painted and large wall areas occur. The spray equipment shall be airless type. The Consultant may at any time prohibit use of spray painting for such reasons during

application as carelessness, poor masking or protective measures, drifting paint fog, disturbance to other trades or failure to obtain a dense even opaque finish. All motors, fans and mechanical ventilation system equipment are to be shut off during spray painting.

3.3.3. Materials shall be thoroughly mixed before application and applied without cutting or admixture of any kind except as may be directed by the manufacturer. They shall be applied evenly, in full coats free from brush marks, sags, runs, crawls and other defects. Paint shall be uniform in sheen, colour and texture.

3.3.4. Apply materials in strict accordance with manufacturer's directions and specifications and be familiar with those directions and specifications.

3.3.5. Any areas exhibiting incomplete or unsatisfactory coverage shall have the entire plane painted. Patching will not be acceptable.

3.3.6. Permit paint to dry before applying succeeding coats, touch up suction spots and sand between coats with #120 grit sandpaper. Remove dust of sanding.

3.3.7. Finishes and number of coats specified are intended to cover surfaces completely. If they do not, apply further coats until complete coverage is achieved as required. Paint entire plane or areas which have been cut and patched.

3.3.8. Arrange to have traffic barred from completed areas wherever possible or provide adequate protection acceptable to the Consultant.

3.3.9. Tint filler to match wood to receive clear finishes. Work filler well into grain and before it has set wipe excess from surface.

3.3.10. Prime woodwork designed for painting as soon as possible after woodwork is delivered to site. Prime all surfaces of such woodwork, whether exposed or not, before installation. Back prime woodwork which is to receive transparent finish with one coat of transparent finish reduced 25 per cent.

3.3.11. Reseal cut edges of wood doors and seal or prime tops and bottoms of wood doors with 3 coats polyurethane sealer.

3.3.12. Apply primer coats to ferrous metal surfaces that have not received shop coat or primer.

3.3.13. Exposed concrete and concrete block walls which are scheduled to be painted shall not be painted until the caulking sealant has been applied at control joints and hollow metal frames by Section 081100.

3.3.14. Touch-up shop primed metal work after loose paint and scale have been removed.

3.3.15. Make good paint finish on delivered items where surfaces have become marred or defaced.

3.3.16. Painting shall be three coat work throughout except where specifically indicated otherwise. Priming coat shall be colour toned lighter than second coat; second lighter than finish coat; finish coat shall be approved colour. Each coat shall be inspected by the Consultant. If recoating occurs without Consultant's inspection it shall not be considered as having been done and shall be recoated.

3.4. **Field Finishing of Wood Doors**

3.4.1. Before finishing, thoroughly sand all surfaces with a hand block and #120 grit industrial sandpaper to remove handling marks and raised grain.

3.4.2. Sanding and finishing shall be done with the door in a horizontal position.

3.4.3. Immediately after fitting and sanding and before hanging, seal the entire door, including the top, bottom, opening and hardware recessed edges, with at least 3 coats of specified finish. Where no finish is specified, seal top, bottom, opening and hardware recessed edges, with at least 3 coats of phenolic varnish.

3.4.4. Do not use steel wool, water based finishes or combination sealer stains.

3.5. **Field Quality Control**

3.5.1. Prior to any painting being started, arrange for a meeting on site between Consultant, Contractor and material manufacturer's representative to review conditions, surfaces, anticipated problems and to ensure proper preparation use of materials and proper

coverage rates. Following the site meeting the Contractor shall prepare a sample room or area under the supervision of the paint manufacturer's representative based on recommendations and decisions made at the site meeting. The sample room or area selected shall include the finishing of all materials and surfaces specified and scheduled for the work. The minimum sample area for each material and finish shall be:

3.5.1.1. Concrete block, concrete and gypsum board: 100 sq.ft.

3.5.1.2. Hollow metal doors and frames, wood doors and frames: one door and frame for each finish specified.

3.5.2. Upon completion and approval, sample finishes shall serve as a standard for the balance of the work. Subsequent work carried out and not in the Consultant's opinion equal to the standard shall be repainted without charge.

3.6. **Mechanical and Electrical Work**

3.6.1. Finish paint primed mechanical and electrical equipment (heaters, convectors, air handling units, radiators, fire hose cabinets, electrical cabinets, louvres, grilles, diffusers and other items) with two coats of paint.

3.6.2. Prime and paint exposed insulated and bare pipes, ducts and hangers. Prime and paint exposed conduits and electrical raceways, fittings, outlet boxes, junction boxes, pull boxes and similar items. Use heat resistant epoxy paint on pipes and surfaces where operating surface temperature exceeds 65C.

3.6.3. Co-ordinate the painting of pipes, ducts and coverings with mechanical contractor to ensure that he does not install pipe colour banding, flow arrows and pipe identification until the painting of the pipes, coverings and ducts has been done.

3.6.4. Remove grilles, covers, access panels for mechanical and electrical systems from installed locations and paint separately if these items are not factory finished.

3.6.5. Paint work to match adjacent walls and ceilings unless directed otherwise.

3.6.6. Paint interior surfaces of air ducts and pipe trenches including heating pipes and elements that are visible through grilles and louvres with one coat of flat metal paint to limit of sight-line. Paint to be black or white as directed by Consultant.

3.6.7. Gas pipes, whether concealed or exposed, shall be painted in yellow-orange colour, in accordance with Gas Utilization Code, Section #37 of Ontario Regulation #166/66.

3.6.8. Where walls and ceilings are not scheduled to be painted, work described above other than plated surfaces shall be painted.

3.6.9. Paint all exterior galvanized and prime painted steel mechanical and electrical equipment including ducts, pipes, fans, louvres, conduits, stacks and vents.

3.6.10. Paint and finish all wall surfaces behind convectors. Walls to be finished prior to installation of convector covers. Touch up walls after covers are installed as necessary to make good installation damage.

3.6.11. Paint metal access panels while open and keep open until dry.

3.6.12. Air diffusers shall be primed and finished with two coats of paint of same colour and sheen as ducts and/or ceiling.

3.7. **Patching**

3.7.1. Do all retouching to ensure that the work is handed over to the Owner in perfect condition, free of runs, spatter, finger marks, rust, watermarks, scratches, blemishes or other disfiguration.

3.7.2. After fully decorating, retouching and finishing a room or area, notify Consultant. After inspection and acceptance post sign "Decorating Complete - No Admittance Without Permission".

3.8. **Cleaning**

Promptly as the work proceeds and on completion of the work, remove all paint where spilled, splashed or spattered during the progress of the work keep the premises free from any

unnecessary accumulation of tools, equipment, surplus materials and debris; at the conclusion of the work leave the premises neat and clean to the satisfaction of the Consultant.

3.9. **Schedules**

3.9.1. Finish Schedule:

3.9.1.1. Assume full responsibility for painting and varnishing of all materials of the contract exposed in the finished work which do not already have finished surfaces and that normally require paint or varnish finish. Inspect surfaces over which the work of this Section is dependent for unevenness, cracks, surface defects, moisture, cleanliness, roughness and other irregularities detrimental to the application and performance of the work. Confirm conditions satisfactory before proceeding.

3.9.1.2. Exposed means visible in complete work including interiors of cupboards and closets.

3.9.1.3. The Consultant shall have the option of having wood painted or with transparent finish; wood shall be stained to Consultant's approval.

3.9.1.4. In instances where materials specified are not suitable for particular job application or are contrary to manufacturer's recommendations for use on particular surface, immediately bring to attention of Consultant for clarification and instructions.

3.9.1.5. The Consultant shall have right to make changes in colour tone of finishes prior to final coat to obtain desired results without additional cost to Owner.

3.9.1.6. Gloss terms have following values (ASTM D523- 67 "Test For Specular Gloss"):

Gloss Term	Value Flat
Flat	5 to 20
Eggshell	20 to 40
Semi-Gloss	40 to 60
Gloss, Medium	60 to 80
Gloss, High	80 to 90

3.9.1.7. The following titles and code numbers refer to the Ontario Contractors Association Architectural Painting Specification Manual, latest edition, unless otherwise indicated for type of coating, grade, named products and their manufacturers. All finishes are to be prime grade. Meet requirements of Architectural Painting Specification Manual for surfaces requiring painting, for which paint formula is not included hereunder.

3.10. **Typical Interior Painting Schedule**

3.10.1. For concrete block and poured concrete walls apply:

3.10.1.1. One coat block filler CGSB 1-GP-188-M

3.10.1.2. One coat primer-sealer CAN/CBSB 1.119-M

3.10.1.3. Two coat acrylic latex semi-gloss

3.10.2. For typical gypsum board walls and ceilings, apply:

3.10.2.1. One coat latex primer-sealer CAN/CBSB 1.119-M

3.10.2.2. Two coats acrylic latex eggshell

3.10.3. For gypsum board walls and ceilings at service areas, storage rooms, corridors, bathrooms and kitchens apply:

3.10.3.1. One coat primer-sealer CAN/CBSB 1.119-M

3.10.3.2. Two coats acrylic latex semi-gloss

3.10.4. For painted wood surfaces apply:

3.10.4.1. One coat enamel undercoat CAN/CGSB 1.38M

3.10.4.2. Two coat semi-gloss enamel CAN/CGSB 1.57-M

3.10.5. For stained finish on hard open and closed grain hardwoods apply:
- 3.10.5.1. One coat oil or wood stain
- 3.10.5.2. One coat 1 coat polyurethane varnish, reduced 25 per cent.
- 3.10.5.3. Two coats polyurethane satin varnish

3.10.6. For primed ferrous metal surfaces apply:
- 3.10.6.1. One coat spot priming CAN/CGSB 1.40-M
- 3.10.6.2. One coat enamel undercoat CAN/CGSB 1.40-M
- 3.10.6.3. Two coats semi-gloss enamel CAN/CGSB 1.57-M

END OF SECTION

1. GENERAL

1.1. General Instructions

Read and be governed by Conditions of the Contract and Sections of Division 1.

1.2. Work of Related Sections

1.2.1. Rough carpentry - under Section 061000.
1.2.2. Steel stud framing - under Section 092200.
1.2.3. Gypsum board - under Section 092116.
1.2.4. Field painting - under Section 099100.

1.3. Samples

Submit duplicate samples of each finish specified, in accordance with Section 013323.

1.4. Shop Drawings

1.4.1. Submit shop drawings for work of this Section in accordance with Section 013400.
1.4.2. Clearly indicate fabrication details, plans, elevations, hardware, and installation details.

1.5. Maintenance Data

Provide operation and maintenance data for incorporation into maintenance manual specified in Section 017300.

1.6. Templates

Submit templates to Contractor for use by installers and fabricators as required for proper location and installation of hardware.

1.7. Delivery, Storage and Handling

Package or crate, and brace products to prevent damage during shipment and handling. Label packages and crates, and protect finish surfaces from environmental conditions where required.

2. PRODUCTS

2.1. General

Incorporate reinforcing, fastenings and anchorage required for building in of products.

2.2. Curtain Track

2.2.1. Acceptable manufacturer: Silent Gliss or approved alternative.
2.2.2. Track system materials: #6010 Curtain Track shall be 6063-T6 clear anodized aluminum, surface mounted.
2.2.3. System parts: #6147 self lubricating nylon gliders with lower lip (preventing gliders from disappearing into track) complete with stainless steel hooks at 102mm (4") o.c.; two #6053 spring stops; and two #6013 endstops.
2.2.4. Contractor shall submit track layout template to track manufacturer for custom track bending. Track layout shall not traverse light fixtures.

3. EXECUTION

3.1. Installation

3.1.1. Provide manufacturer's information and templates required for installation of work of this Section, and assist or supervise, or both, the setting of anchorage devices, and construction of other work incorporated with products specified in this Section in order that they function as intended.
3.1.2. Install work to meet manufacturers' specifications and installation instructions, true, tightly fitted, and level or flush to adjacent surfaces, as suitable for installation.
3.1.3. Include reinforcing, anchorage and mounting devices required for the installation of each product.

3.1.4. Fit joints and junction between components tightly and in true planes, conceal and weld joints where possible.

3.1.5. Fabricate products with materials and component sizes, metal gauges, hardware, reinforcing, anchors, and fastenings of adequate strength to ensure that Work will remain free of warping, buckling, opening of joints and seams, and distortion within limits of intended use.

3.1.6. Back paint components where contact is made with building finishes to prevent electrolysis.

3.2. **Adjustment and Cleaning**

3.2.1. Verify under work of this Section that installed products function properly, and adjust them accordingly to ensure satisfactory operation.

3.2.2. Refinish damaged or defective Work so that no variation in surface appearance is discernible.

3.2.3. Final cleaning as specified in Section 017413.

END OF SECTION

1. **GENERAL**

1.1. **General Instructions**

Read and be governed by Conditions of the Contract and Sections of Division 1.

1.2. **Related Sections**

1.2.1. Steel stud framing - under Section 092200.
1.2.2. Gypsum board - under Section 092100.
1.2.3. Ceramic tile - under Section 093013.
1.2.4. Field painting - under Section 099100.
1.2.5. Mechanical/Electrical - under Division 22 and 26.

1.3. **Samples**

Submit duplicate samples of each finish specified, in accordance with Section 013323.

1.4. **Shop Drawings**

1.4.1. Submit shop drawings for work of this Section in accordance with Section 013400.
1.4.2. Clearly indicate fabrication details, plans, elevations, hardware, and installation details.

1.5. **Maintenance Data**

Provide operation and maintenance data for incorporation into maintenance manual specified in Section 017300.

1.6. **Templates**

Submit templates to the Contractor for use by installers and fabricators as required for proper location and installation of hardware.

1.7. **Delivery, Storage and Handling**

1.7.1. Package or crate, and brace products to prevent distortion in shipment and handling. Label packages and crates, and protect finish surfaces by sturdy wrappings.
1.7.2. Deliver products to location at building site designated by the Contractor.

2. **PRODUCTS**

2.1. **Products**

2.1.1. Incorporate reinforcing, fastenings and anchorage required for building in of products.
2.1.2. Keyed (tumbler lock) accessories shall be keyed alike.
2.1.3. Lettering: for identification of accessories and operation instructions shall be silk screened using international symbols unless otherwise specified.
2.1.4. Construct cabinets of 18-8, type 304 stainless steel.
2.1.5. Construct waste receptacles of 18-8, type 304 stainless steel or rigid molded leak-proof plastic.
2.1.6. Waste receptacles or cabinets manufactured of type 400 stainless steel are not acceptable.
2.1.7. Fasten tumbler locks to accessories with lock nuts. Fastening locks to units with spring clips is not acceptable.

2.2. **Washroom Accessories**

2.2.1. Acceptable manufacturers: products as manufactured by Watrous Sales Inc., Twin-Cee or Bobrick.
2.2.2. Refer to Washroom Accessories Schedule on Drawings for washroom accessories, excepted as specified herein.
2.2.3. Grab bars; to the following specification unless otherwise indicated on the Drawings:
2.2.3.1. General: 30 - 40mm (1 3/16" - 1 9/16") o.d., with a clearance from wall of 30 - 40mm (1 3/16" - 1 9/16"), minimum 1.2mm (18 ga.) tubing, stainless steel, with mandrel bends, peened full length of the tubing to 100mm (4") of ends or bends and secured with 65mm (2 1/2") No. 14 screws to solid backing and capable of supporting 112 N (250 lbf) force applied.

2.2.3.2. Washrooms:

2.2.3.2.1. One 760mm (30") grab bar adjacent on a 30° angle to toilet, with lower component mounted 230 mm (9") above toilet seat and 50mm (2") in front of toilet bowl.

2.2.3.2.2. One 600mm (24") grab bar mounted horizontally on the wall 150mm (6") above water tank.

3. EXECUTION

3.1. Inspection

3.1.1. Check wall open for dimensions, plumbness of blocking or frames that would affect installation of recessed accessories. For surface mounted accessories check condition of wall and confirm installation of backing within wall.

3.1.2. Verify spacing of plumbing fixtures and toilet compartments that affect installation of toilet room accessories.

3.2. Installation

3.2.1. Provide manufacturer's information and templates required for installation of work of this Section, and assist or supervise, or both, the setting of anchorage devices, and construction of other work incorporated with products specified in this Section in order that they function as intended.

3.2.2. Install work to meet manufacturers' recommended specifications, true, tightly fitted, and level or flush to adjacent surfaces, as suitable for installation.

3.2.3. Include reinforcing, anchorage and mounting devices required for the installation of each product.

3.2.4. Fit joints and junction between components tightly and in true planes, conceal and weld joints where possible.

3.2.5. Fabricate products with materials and component sizes, metal gauges, hardware, reinforcing, anchors, and fastenings of adequate strength to ensure that Work will remain free of warping, buckling, opening of joints and seams, and distortion within limits of intended use.

3.2.6. Supply handling instructions, anchorage information, roughing-in dimensions, templates and service requirements for installation of Work of this Section, and assist or supervise, or both, the setting of anchorage devices and construction of other Work incorporated with products specified in this Section.

3.2.7. Install accessories at locations and heights indicated, straight, plumb and level and in accordance with manufacturer's installation instructions.

3.2.8. Install items with non-corrosive anchoring devices.

3.2.9. Conceal evidence of drilling, cutting, and fitting to room finish.

3.2.10. Fit flanges of accessories snugly to wall surfaces.

3.3. Barrier Free Installation Heights

3.3.1. Install accessories to permit operable parts and controls to be accessed at 1100mm (43") maximum above finished floor, unless otherwise indicated.

3.4. Adjustment and Cleaning

3.4.1. Verify under work of this Section that installed products function properly, and adjust them accordingly to ensure satisfactory operation.

3.4.2. Upon completion of the work, or when directed, remove all traces of protective coatings or paper.

3.4.3. Adjust accessories for proper operation. Test mechanisms, hinges, locks and latches and where necessary adjust and lubricate.

3.4.4. Clean and polish exposed surfaces prior to final installation.

3.4.5. Final cleaning as specified in Section 017000.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Conform to sections of Division 1 as applicable.

1.1.2 Section 230000 shall apply to and govern the work of this section.

1.1.3 Provide labour, materials, products, equipment and service to complete the Automatic Sprinkler System Work.

1.1.4 Sprinkler layout shown on the drawings is for reference only.

1.1.5 All sprinkler work shall be performed by Landlord's approved Contractor.

1.2 **Reference Standards**

1.2.1 Do work in accordance with the following, except where specified otherwise:

1.2.1.1 NFPA 13 (latest issue).

1.2.1.2 NFPA 20 (latest issue).

1.2.1.3 I.A.O. [Insurance Advisory Organization] (latest issue).

1.2.1.4 Provincial Building Code (latest issue).

1.2.1.5 Provincial Fire Code (latest issue).

1.2.2 The complete installation shall comply with the above stated rules and regulations and with the decisions of the Inspection Authorities having jurisdiction, at no extra cost to the Contract.

1.3 **Design Densities And Shop Drawings**

1.3.1 All systems shall be hydraulically sizes on existing water availability, unless noted otherwise.

1.3.2 The design densities and design areas shall be in accordance with I.A.O., unless noted otherwise.

1.3.3 Submit shop Drawings to the Insurance Advisory Organization for review.

1.3.4 Ensure that Drawings submitted to the Architect/Engineer for review bears the Insurance Advisory Organization stamp of certification.

1.3.5 Provide sprinkler hydraulic calculation for review. Calculations shall bear the seal and be signed by a Professional Engineer.

1.3.6 Do no start work under this Section until Shop Drawings have been reviewed by the Architect/Engineer.

2. **PRODUCTS**

2.1 **Pipe And Fittings**

2.1.1 Unburied piping shall be standard black steel pipe, stretch reduced continuous weld up to and including 100mm (4 in.) dia. and for 125mm (5 in.) dia. and over, electric resistance weld. Fittings shall be standard screwed iron fittings. Piping may be welded, using standard welding fittings if approved by authorities having jurisdiction.

2.1.2 Where approved by the Authorities lightwall piping may be used for piping of 50mm (2 in.) dia.

2.1.3 After system is complete, flush and test entire system as per NFPA standard No. 13.

2.1.4 Provide Underwriter approved hangers, and support all piping from building structure. Under no circumstances shall piping be hung from ductwork or steel roof-deck. Provide secondary steel supports where piping under ducts cannot be supported directly from structure. Where pipes are hung from joists, they shall be hung from top cord.

2.2 **Sprinkler Heads**

2.2.1 Provide sprinkler heads in areas without suspended ceilings, Grinnell model F950 standard upright, unless otherwise noted on Drawings.

2.2.2 Provide sprinkler heads in suspended ceilings Grinnell pendant automatic Issue `D' semi-recessed sprinklers compete with #SSP-1 mounting plates chrome plated, unless noted on Drawings.

2.2.3 Provide sidewall sprinkler heads, Grinnell model F950 with Q-31 deflector all chrome

plated, unless otherwise noted on Drawings.

2.2.4 Sprinkler heads at Atrium glazing shall be Grinnell's Issue `D' pendant style sprinkler head, chrome plates, unless otherwise noted on Drawings.

2.2.5 Temperature ratings of sprinkler heads shall be suitable for particular location, i.e. in general 75°C. (165°F.), heads shall be used, with higher temperature heads adjacent to unit heaters, etc.

2.2.6 Provide sprinkler guards for sprinkler heads in storage areas, receiving area if located below a ceiling or structure.

3. EXECUTION

3.1 Piping

3.1.1 Run all piping equidistant and parallel to walls, partitions, building lines, etc. and maintain maximum possible head room.

3.1.2 Do not use or cover any pipe, fittings or work of any kind before it is examined and approved by the Architect/Engineer.

3.1.3 Do not use direct welded or screwed connections to other piping. Make all connections with a suitable union or flange in the piping connections.

3.1.4 Support horizontal piping with hangers and with maximum spacing as follows:

3.1.4.1 1.8m (6 ft.) apart on 19.1mm (3/4 in.) dia. and smaller.

3.1.4.2 2.4m (8 ft.) apart on 25.4mm to 76.2 mm (1 in. to 3 in.).

3.1.4.3 3.7m (12 ft.) apart on 101.6mm (4 in.) and larger.

3.1.5 Install hanger rods vertical without bends or offsets such that finished piping is aligned correctly both with respect to line and grade.

3.1.6 Secure all hanger rods directly to the building structure by means of inserts or clamps. Do not support from other pipes and ducts. Give all hangers and rods. etc., two heavy coats of primer paint before concealing.

3.1.7 Support vertical piping at its base by hangers placed as near as possible to the horizontal pipe to which it is connected. Provide pipe supports at each floor using iron brackets and pipe clamps. Use 9.5mm (3/8 in.) MS plates as pads or anchored into vertical concrete for connections or brackets on floor levels.

3.1.8 Where rod anchors or clamps cannot be installed directly to the structure (due to concealed electrical conduits or ductwork etc.), use trapeze type hangers constructed of suitable channel iron. Clamp each pipe individually to the channel support.

3.1.9 Do not use cartridge fired insets, pins, etc., use self-drilling expansions shields or cast-in-place inserts only.

3.2 Jointing Of Piping

3.2.1 Threaded Joints:

3.2.1.1 Make threaded joints strong, perfectly watertight with no more than 2 threads showing.

3.2.1.2 Use American National Taper Pipe Thread.

3.3 Pipe Sleeves

3.3.1 Install sleeves for all piping passing through floors, wall, etc., as specified herein.

3.3.2 Sleeves as specifically noted, or through structural walls or beams are Schedule 40 steel. All other sleeves are 0.635mm (24 gauge) galvanized sheet steel.

3.3.3 Fit sleeves flush on either side of the wall or beam through which they pass, extend sleeves through floors and terminate 50.8mm (2 in.) above finished floor.

3.3.4 Where passing through walls or beams make sleeves minimum 6.35mm (1/4 in.) clear of the piping and where passing through floors make sleeves minimum 19.05mm (3/4 in.) clear of the piping and caulk for full depth and finish with a lagging compound.

3.3.5 Provide cast iron escutcheon plates with set screws to completely cover openings for all exposed pipes passing through walls.

3.4 **Flushing System**

Before making final connections arrange to flush the new piping to remove all dirt and foreign matter. Run discharge of the flushing operation through hoses to the sewer.

3.5 **Testing Of Piping System**

3.5.1 Supply all labour, material and equipment necessary to perform tests on piping systems as scheduled below.

3.5.2 Advise the Architect/Engineer and all authorities having jurisdiction of all tests at least 48 hours in advance of such tests.

3.5.3 Schedule of Tests:

3.5.3.1 Hydraulically test all changes to wet sprinkler systems at not less than 1380 kPa (200 psi) for 2 hours in the manner as prescribed in NFPA 13 with no leakage.

3.5.3.2 Where the static pressure exceed 1033 kPa (150 psi), increase the test pressure in all of the above to 345 kPa (50 psi) in excess of the actual maximum static pressure.

3.5.4 If the test leakage in any section is greater than that permitted by the NFPA Codes, locate and repair the defective joints of pipe until the leakage is within the permitted allowance.

3.5.5 Make all necessary arrangements to have the entire system tested and reviewed by the Insurance Advisory Organization and/or the local authority having jurisdiction as applicable. Provide copies of the certification to the Architect/Engineer for distribution.

3.6 **Drainage and Test Connections**

3.6.1 Arrange all branch lines and mains to drain back to the main risers or approved drum traps as required and approved by the Architect/Engineer.

3.6.2 Slope all sprinkler lines at 6.35mm in 3.05m (1/4 in. in 10 ft.).

3.7 **Insulating Couplings**

Install line size dielectric insulating couplings to prevent galvanic corrosion between dissimilar metals throughout all piping systems.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Conform to Section of Division 1 as applicable.

1.1.2 Section 230000 shall apply to and govern the work of this Section.

1.1.3 Provide labour, materials, products, equipment and service to complete the Plumbing Systems Work.

1.2 **Codes And Regulations**

1.2.1 All work shall be done in accordance with Canadian Plumbing Code, latest edition, and regulation of City, Local, Provincial and/or Territorial Authorities having jurisdiction.

1.2.2 All work done in Ontario shall be in accordance with the Ontario Building Code.

1.3 **Workmanship**

1.3.1 Work shall be executed by plumbers holding certificates of competency.

1.3.2 Rough-in, install and connect fixtures and equipment in exact conformity with their respective manufacturer's details and fit with individual shut-off. Lay or hang lines to approved falls, and arrange so that any or all systems may be completely drained.

1.3.3 Conceal roughing-in, except where otherwise specifically allowed, and extend piping through wall as necessary to suit all connection requirements.

1.4 **Connection For Other Trades**

Provide valved hot and/or cold water connection to all equipment supplied by Other Trades, requiring same and connect.

2. **PRODUCTS**

2.1 **Domestic Cold Water System Distribution**

2.1.1 Provide a complete domestic cold water system consisting of the following components:

2.1.1.1 Main Service Header

2.1.1.2 Distribution Pipe and Fittings

2.1.1.3 Valves

2.1.2 Maximum acceptable pressure drop through backflow preventers is 35 kPa (5psi).

2.1.3 Provide valved connections from the supply system, to fixtures, hose bibbs and all other equipment requiring cold water connections throughout the building(s).

2.2 **Domestic Hot Water System Distribution**

2.2.1 Provide a complete domestic hot water system(s) consisting of the following components:

2.2.1.1 Domestic Hot Water Heaters

2.2.1.2 Controls

2.2.1.3 Distribution Pipe and Fittings

2.2.1.4 Valves

2.2.2 Provide domestic hot water heaters as specified.

2.2.3 Provide valved connections from hot water supply system(s) to fixtures, hose bibbs and all other equipment requiring hot water connections.

2.3 **Drainage**

2.3.1 Check proposed lines of all excavation work necessary for underground drains before any trenching is commenced.

2.3.2 Do not use double hubs, straight crosses, double T's, or double TY's in any soil or waste pipe below any fixture. Do not branch fittings other than a full "Y" or "Y" and an eighth bend, on any soil or waste pipe running in a horizontal direction. Do not use quarter bends placed on their sides. Do not use inverted joints below any fixture. Drainage fittings shall be equal in quality and wall thickness to piping to which they are attached.

2.4 **Flashing**

Flashing for piping penetrating through roof or other waterproof area, shall be in accordance with CSA B272 - M1978 or shall be fabricated from five pound sheet lead and shall have a minimum dimension of 500mm x 500m (20"x20"). Extend sleeve at least 150mm (6") above roof. Leave flashing ready as directed by Roofing or Waterproofing Trades for them to make watertight connections.

2.5 **Vents**

Vents passing through roof shall terminate not less than 160mm (6") high above roof and shall have roof vent connections complete with vent stack sleeve.

3. **EXECUTION**

3.1 **Installation**

3.1.1 The general runs of mains, risers, runout and connection details of piping systems are shown. Mains, risers and runouts shall be concealed behind furring or above ceilings except in mechanical equipment rooms, fan rooms, service corridors, vertical duct and pipe shafts and parking garage levels where they shall be exposed.

3.1.2 Examine the Architectural Drawings and Room Finish Schedules to determine the exact areas without ceilings. In these areas keep piping as high as possible.

3.1.3 Note that in certain locations holes are provided through beams or bearing walls through which piping may be run. Examine the Structural Drawings for the exact location of these holes. Install all piping as high as possible above the ceilings and lighting fixtures.

3.1.4 Anchor, guide and laterally support vertical and horizontal runs or piping as required to support its weight and absorb thrust. Adequately guide domestic hot water and hot water recirculation risers at each floor level to prevent "snaking".

3.1.5 Provide balancing valves on water risers. Provide drain valves at the heel of each riser, on the upstream side of shut-off valves and at each water connection of tanks and other pieces of equipment served. Provide shut-off valves and drips on branches to hose bibbs and hydrants.

3.1.6 Provide approved type vacuum breakers and backflow preventers on equipment, hose bibbs, and fixture connections as required by local codes, as shown, or as required for the proper functioning of the equipment.

3.1.7 Where hot and cold water supply pipes connect to a combination supply fitting with a shut-off valve on its discharge, or the combination supply fitting is equipped with manual or a thermostatic mixing valve, equip each hot and cold water supply pipe with a composition disc serving check valve ahead of the supply fitting.

3.1.8 Clamp underground water pipe at bends and tees, with 20mm (3/4") rods and anchor it to building where possible. Concrete anchor blocks of 0.4m3 (1/2 cu.yd.) size, using 20 MPa (3000 lb) concrete shall be provided when pipe cannot be anchored to building.

3.1.9 Flush and clean domestic water systems after pressure tests. Provide all necessary chemicals and equipment and disinfect systems to the approval of authorities having jurisdiction.

3.2 **Sterilization**

3.2.1 Before placing into service, chlorinate the water piping system by injection of mixture of 5 per cent calcium hypochlorite and 95 per cent water thoroughly mixed from paste form to full mixture.

3.2.2 Inject the mixture into the mains in such a manner as to ensure treatment of the entire line.

3.2.3 Retain a dosage of 50 p.p.m. in the line for 4 hours after which a residual of 5 p.p.m. minimum should be obtained.

3.2.4 When a pipe line is already filled with water, inject a concentrate chlorine mixture at intervals along the pipe line. The retention period in this case shall be 8 hours.

3.2.5 Operate all valves during chlorination so that they will be sterilize in the procedures. After chlorination period flush out the lines at extremities until water tests are equal, chemically and bacteriologically to those of the source of supply.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Conform to Sections of Division 1 as applicable.

1.1.2 Provide labour, materials, products. equipment and service to complete the Mechanical Insulation Work.

1.2 **Quality Assurance**

1.2.1 Requirements of Regulatory Agencies:

1.2.1.1 The type, manufacture and application of pipe covering materials including application of sealer coat, shall be in strict accordance with requirements of local and Provincial Authorities having jurisdiction, and Underwriters' Laboratory of Canada.

1.2.2 Qualifications:

1.2.2.1 Work of this Section shall be done by a recognized insulation applicator specializing in and with established reputation for this type of work.

1.3 **Submittals**

1.3.1 Submit technical data.

1.3.2 Submit samples for approval of canvas material used for finish covering, prior to ordering same.

1.4 **Product Delivery, Storage and Handling**

Keep insulation materials dry while in shipment and on Site.

2. **PRODUCTS**

2.1 **Materials**

2.1.1 General:

2.1.1.1 Product type designations of Fiberglas Canada Ltd., Manson insulation Inc., and Knauf for insulation materials, and Benjamin Foster Division, Amchem Products Inc., for coatings, sealers and adhesives, have, in most cases, been used in Specifications and on Drawings to indicate physical properties and quality standards not otherwise described.

2.1.1.2 Equivalent products of the following companies are acceptable provided that they conform to very other requirement of these Specifications.

Insulation Materials:

.3 Atlas Turner.

.4 Homes Insulation Ltd.

2.1.1.3 Fire Retardant Lagging Coatings, Sealers and Adhesives:

.1 Bakelite Thermosets Ltd., Flintguard 120-18.

.2 Childers Products Co., Chil-Seal CP 50.

.3 Minnesota Mining and Manufacturing of Canada Ltd.

2.1.1.4 Where applicator proposes to use materials other than those specified as acceptable, he shall submit a complete list of such materials indicating thickness of material for each individual service. Do not purchase materials so submitted until approval in writing has been received from the Architect/Engineer.

2.1.2 Pipe Insulation:

2.1.2.1 Provide 1 of the following pipe insulation types and as scheduled in the Pipe Insulation Table.

.1 Type P-1:

Fiberglas 850 Pipe Insulation, Manson Micro-Lok 650 Fiberglas Pipe Insulation or Knauf Pipe Insulation with factory applied all purpose vapour barrier jacket.

2.1.2.2 Pipe Insulation Table:

Duty	Insulation Type	Thickness	Vapor Barrier
1. Domestic cold water			
25mm (1") & less	P-1	25mm (1”)	Yes
32mm (1¼") to 50mm (2")	P-1	50mm (2")	Yes
65mm (2½") to 100mm (4")	P-1	50mm (2")	Yes
125mm (5") and larger	P-1	50mm (2")	Yes
2. Domestic hot and domestic tempered water			
25mm (1") and less	P-1	25mm (1")	No
32mm (1¼") to 50mm (2")	P-1	50mm (2")	No
65mm (2½") to 100mm (4")	P-1	50mm (2")	No

2.1.3 Sheet Metal:

.1 Provide one of the following external sheet metal insulation types, and as scheduled in the Sheet Metal Insulation Table.

.2 Type D-4: Fiberglas Flexible Duct Insulation, Manson Microlite Insulation or Knauf Duct Wrap, 12 kg/cubic metre (3/4 lbs./cu./ft.) density with factory applied reinforced foil facing. Adhere insulation to duct surface with Childers CP82 or Bakelite 230-39 adhesive, which shall be applied in strips 150 (6") wide at not greater than 300mm (12") centres Butt edges of insulation tightly together, and seal breaks and joints of facing with self-adhering 100mm (4") wide aluminum tape or adhere foil with Childers CP82 or Bakelite 230-39 adhesive.

Duty	Insulation Type	Thickness	Vapor Barrier
1. Outside air plenums and ducts	D-4	50mm (2")	Yes
2. Relief & exhaust air ducts	D-4	40mm (1-1/2")	Yes
3. Conceal supply air ductwork located in non-air conditioned areas	D-4	25mm (1")	Yes
4. Conceal supply air ducts from supply air units to air terminal control units, but excluding flexible ducts on entering side of air terminal control unit	D-4	25mm (1")	Yes

2.1.4 Do not insulate the following Plumbing and Heating items:

.1 Rain Water Leaders (vertical), soil stacks, vents, etc. excepted as noted

.2 Chromium plated piping adjacent to plumbing fixtures.

.3 Fire line branches beyond 600mm (12") from branch take-off at the main water line.

3. EXECUTION

3.1 General

3.1.1 Ensure that pipes, fittings and equipment are dry and clean before applying covering.

3.1.2 Do not apply insulation until the items to be covered has been tested against leakage.

3.1.3 Butt joints firmly together. Stagger joints in multiple layer construction.

3.1.4 Mitre insulation at pipe elbows 25mm (1") size and smaller and wrap joint with tape. Where pipe is not to be covered, wrap joint with fire resistant vapour barrier jacket cement with an approved adhesive and extending one covering diameter each side of joint throat.

3.1.5 Locate longitudinal seams so to be visible and seal with fire resistant adhesive.

3.1.6 Pipe covered with insulation having a vapour barrier jacket shall pass through walls or floors with continuous covering.

3.1.7 Protect insulation passing through floors, walls and similar barriers with a 1.24mm thick [16gsg] sheet steel sleeve large enough to accommodate the full thickness of the insulation and approximately 100mm (2") high and secured properly to floor.

3.1.8 Tightly pack annular space between sleeve and pipe covering, for full length of sleeve, with Fiberglas or rockwool and finish flush at each end with caulking compound, aluminum colour.

3.1.9 Protect insulation by means of 1.24mm thick (18 gauge) galvanized sheet steel shields where such insulation is supported by hangers, on rollers, or other type of support.

3.1.10 Provide non-combustible insulation, jackets and finishes so that the maximum flame spread rating is 25 or lower and smoke index rating is 50 or lower.

3.1.11 As an alternative to fire retardant lagging coating, apply stucco embossed aluminum jacketing to pipe and equipment insulation manufactured from 0.46mm aluminum. Provide jacketing with banding at 305 centres as directed by supplier.

3.1.12 Provide sufficient space to allow proper installation of insulation.

3.1.13 Canvas finishes shall be applied to piping and ductwork in crawl spaces in equipment rooms, in pipe shafts, in exposed ceiling spaces etc.

3.1.14 No staples shall be tolerated on insulation having vapour barrier installation.

3.2 Piping Insulation

3.2.1 Domestic Water Supply and Re-circulation Lines; Sanitary and Storm Drains:

3.2.1.1 Cover water, soil, waste and rainwater piping, including fittings, with glass fibre insulation securely fastened in place with copper wire wrapping. Cover with canvas jacket neatly pasted on with adhesive as specified hereinafter. This applies especially where runs of pipes are in unheated pipe space, below roofs and where located in chases in outside walls.

3.2.1.2 Cover all insulated piping in exposed locations with canvas jacket neatly pasted on, herein specified.

3.3 Ductwork Insulation

3.3.1 Insulate sheet metal fresh air and mixed air plenums, supply unit casings and black-off behind unused sections of louvers

3.3.2 Do not apply insulation to casing, ducts, or plenums which have been lined with acoustic insulation, unless indicated otherwise

3.3.3 External insulation shall extend 305mm (1 ft.) over internal acoustic lining

3.3.4 Insulate circular ductwork with vapour seal flexible reinforced foil faced duct insulation except where stated otherwise.

3.3.5 After insulation is applied, seal holes, corners and joints the same day with 76mm (3") scrim foil tape.

3.3.6 Cover angles or standing seams on the outside of plenums, casings and ducts, which extend beyond face of applied rigid insulation with a flexible fire resistant Fiberglas, 16.8 kg/m3 (1.05 lbs/cu.ft.) density, with facing. Extend this insulation 76mm (3") on each side other angle and place tight around the projecting leg of the angle. Apply rigid insulation overlapping edge of flexible Fiberglas on angle so that vertical part of insulated angle projects through work. Vapour seal joints with an approved sealer.

3.3.7 Secure insulation to flat sheet metal surfaces by means of welded pins or perforated base metal fasteners and speed washers. Locate on not more than 457mm (18") centres throughout the sheet metal surface with minimum of two rows per duct side, and adhere by fire resistant cement. Attach speed washers, when insulation has been placed on the metal spikes and cut off the excess spike flush with washer.

3.3.8 Secure insulation to circular ducts with adhesive applied in strips 102mm (4") wide at 300mm (12") centres. Seal joints and holes as previously specified.

3.3.9 All access doors on ductwork have to be insulated.

3.4 **Materials Not To Be Used**

3.4.1 Do not use polystyrene, urethane, or any other combustible plastic insulation (whether termed self-extinguishing or not) on the inside of building components, regardless of type. Do not use materials or equipment made with asbestos material.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Conform to Sections of Division 1 as applicable.

1.1.2 Section 230000 shall apply to and govern the work of this Section.

1.1.3 Provide labour, materials, products, equipment and service to complete the Pipe, Valves and Fittings-Plumbing Work.

2. **PRODUCTS**

2.1 **Materials**

2.1.1 Pipe and fittings shall be in conformance with the following unless specified otherwise by local authorities.

2.1.2 All city and domestic water, above grade, 75mm (3 in.) and smaller, less than 1380 kPa (200 psi) working pressure.

2.1.2.1 Copper Pipe, Type `L' with wrought or cast couplings and fittings, to C.S.A. HC-66.

2.1.2.2 Joints shall be soldered copper couplings

2.1.2.3 Fittings shall be soldered cast bronze or wrought copper in accordance with C.S.A. B-158.

2.1.2.4 Gate Valves, 860 kPa (125 psi) WSP or 1380 kPa (200 psi) non-shock WOG with bronze body, non-rising stem, solder ends or screwed to solder adaptor. Crane #1324.

2.1.2.5 Globe Valves, [860 kPa (125 psi) WSP or 1380 kPa (200 psi) non-shock WOG with bronze body, solder ends or with screwed to solder adaptor and composition disc for water service. Crane #1310.

2.1.2.6 Check Valves, 860 kPa (125 psi) WSP or 1380 kPa (200 psi) non-shock WOG with bronze body, swing check solder ends. Crane #1342.

2.1.2.7 Check Valves downstream from pumps, non-slam 1720 kPa (250 psi) WSP.

2.1.2.8 Drain Valves shall be for 1380 kPa (200 psi) non-shock WOG and shall be 3/4" (19mm) gate valves with bronze body, male threaded garden hose end, cap and chain.

2.1.2.9 Hose bibbs shall be for 1380 kPa (200 psi) non-shock, bronze body with composition disc and 3/4" (19mm) garden hose thread.

2.1.3 All city and domestic water below grade, 50mm (2 in.) and smaller:

2.1.3.1 Soft copper type `K'

2.1.3.2 Minimum number of joints 95-5 solder.

2.1.3.3 Gate Valves, bronze body, non-rising stem, extension sleeve and box to grade, to local authorities approval.

2.1.4 All city and domestic water below grade, 65mm (2 ½ in.) and larger:

2.1.4.1 Service water pipe to be C900 polyvinyl chloride.

.1 PVC to AWWA C900

.2 Certified to CSA B137.3

2.1.4.2 Fittings:
Unplasticized polyvinyl chloride Class 150 (DR18) fittings NPS 4 and larger to conform to AWWA C900 and ASTM cell classification 12454B.

2.1.4.3 Joints:

.1 Rubber gasket for flanged pipe joints to be 1.6mm thick and conform to ANSI A21.11.80 or AWWA C-111-80.

.2 Bolts and nuts to be heavy series, hexagonal head pattern with washers to ASTM A307-83a.

2.1.4.4 An approved lubricant which is water soluble and suitable for potable water in accordance with AWWA C111 shall be applied to gasket.

2.1.5 Sanitary Drains and Main Vents above Grade:

2.1.5.1 Pipe and fittings shall be cast iron class 4000 C.S.A. B70M-1978, Bell

and Spigot, or plain ends.

2.1.5.2 Coating shall be factory applied asphaltum.

2.1.5.3 Joints shall be mechanical type with neoprene gasketting.

2.1.6 Buried Sanitary:

2.1.6.1 Pipe:

.1 PVC DWV to CAN 3-181.2-M85.

.2 Plastic DWV to CSA B182.1-M1983.

.3 Plastic schedule irrigation piping Schedule 40 DR26.

2.1.6.2 Joints:

.1 Solvent weld for PVC to ASTM D2564-80.

2.1.7 Back-flow preventers for connection to wall hydrants, hose bibbs, hot water heating systems and similar uses, shall be Watts No. 9 or 900 or other approved manufacture with C.S.A. listing.

2.1.8 Except where special features are required or unless otherwise approved or noted, all valves shall be of one manufacturer with the manufacturer's name and the pressure rating clearly marked on the outside of the valve body.

2.1.9 Standard of Acceptance (Valves):

2.1.9.1 Crane

2.1.9.2 Jenkins

2.1.9.3 Watts

3. EXECUTION

3.1 Installation

3.1.1 Valves shall be provided as shown and as required for the satisfactory operation and control of all equipment and shall be installed to enable each piece of equipment to be isolated.

3.1.2 Gate valves shall be installed at the base of each riser and at each branch take-off. Where the equipment to be isolated is within easy view of and not more than 6m (20 ft.) from the main, at the branch take-off, then the branch take-off valve may serve as the equipment isolating valve.

3.1.3 Drain valves shall be installed at each low point in the piping systems.

3.1.4 Globe valves shall be installed as shown and in each bypass.

3.1.5 Check valves shall be installed as shown and where required to prevent backflow.

3.1.6 Buried Piping:

3.1.6.1 Shall be of a class and type and laid in a bedding as noted and/or as recommended by the manufacturer and any authority having jurisdiction. Class of pipe and bedding shall take into consideration location, size of pipe, type, width and depth of trench and type of soil.

3.1.6.2 Bedding types shall be class `A' or class `B' as detailed on standard drawings for concrete, vitrified clay or cement pipes or the manufacturer's equivalent with minimum load bearing factors of 2.8 and 1.9 respectively.

3.1.6.3 For cast iron pipes bedding shall be class `D' as detailed on standard drawings or the manufacturer's equivalent with minimum load bearing factor 1.5.

3.1.6.4 The following publications shall be used to establish class of bedding and class of piping for installation other than the above. They shall also serve as guide for preparation of bedding, installation and testing.

.1 A.W.W.A. standard C-600-64 for installation of cast iron water mains.

.2 A.W.W.A. standard H1-67 for thickness design or cast iron pipe.

.3 A.W.W.A. standard C-603-65 for installation of cement water pipe.

.4 Installation manual of the Ontario Concrete Pipe Association.

.5 Design data of the American Concrete Pipe Association as distributed by the Ontario Concrete Pipe Association.

.6 Cast iron soil pipe and fittings handbook of the cast iron soil pipe institute.

.7 Sewer pipe manual of Johns-Manville.

.8 Sewer Design & Construction of the Water Pollution Control Federation.

3.1.6.5 Pipe passing under a driveway or parking lot with less than 1.5m (5 ft.) of cover shall be encased in 150mm (6 in.) of 13800 kPa (2000 psi) concrete on top, bottom and sides.

3.1.6.6 PC4 jointing materials shall not be used on underground piping. PC4 or similar jointing material shall be used for caulking waste pipes from sinks or dishwashers and other waste pipes carrying hot discharge liquids.

3.1.6.7 Connections between copper and steel pipe shall be made with brass or bronze fittings where other type of connection is not specified in regulations.

3.1.6.8 All piping shall run parallel with closest wall.

3.1.6.9 Piping in walk-in pipe spaces shall be installed as close to one wall as possible.

3.1.6.10 Slope all drains and vents in accordance with the plumbing code. Slope all water lines 25mm in 12 meters (1" in. 40 ft.) unless shown otherwise.

3.1.6.11 Underground PVC pipes used for City water supply must be installed with a tracer wire directly over the pipe.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Conform to Sections of Division 1 as applicable.

1.1.2 Provide labour, materials, products, equipment and service to complete the Testing, Adjusting and Balancing (TAB) Work.

2. **PRODUCTS**

2.1 **Materials**

2.1.1 A list of the equipment to be used with serial number and date of recent calibration for this project shall be submitted for approval by the Architect/Engineer.

2.1.2 Provide calibration histories for each instrument when accuracy of readings is questionable. Instruments shall be in good condition, recently calibrated and where requested shall be recalibrated by an independent testing agency before proceeding with work.

2.1.3 Provide plumbing fixtures as specified on drawings.

2.2 **Fire Extinguishers**

2.2.1 Provide 5 fire extinguishers as directed on site during construction. Model 2A10BC – 2.3 kg (5lbs.) fire extinguishers with wall bracket.

2.2.2 Approved manufacturer National Fire Equipment Ltd.

2.2.3 Final Locations to be determined at site by Architect/Engineer.

3. **EXECUTION**

3.1 **Definition and Requirements**

3.1.1 TAB means to test, adjust and balance all systems, including equipment, to perform in accordance with Contract Documents.

3.1.2 The total system balance, shall be strictly performed in accordance with the latest edition of the Associated Air Balance Council (AABC) National Standards, 1982 for the total system balance and in accordance with the scope of work specified in the Contract Documents.

3.1.3 Follow start-up procedure as recommended by manufacturer.

3.1.4 Special start-up procedures may be specified elsewhere.

3.1.5 TAB firm shall cooperate with the Architect/Engineer and all subcontracting firms to ensure all systems are left in approved working order to the satisfaction of the Architect/Engineer and performed to meet the construction schedule prepared by the Contractor.

3.1.6 Any abnormal conditions in the mechanical system or conditions which prevent the total system balance shall be reported in writing to the Contractor for immediate review and resolved to the satisfaction of the Architect/Engineer.

3.1.7 Pre-construction plan check and two mechanical construction reviews shall be provided by the TAB firm.

3.1.8 Ensure that all necessary devices i.e. pitot tube caps, snap-in test plugs, etc. necessary for the satisfactory completion of his work. Advise the various subcontractors in writing where test connections are required for connection to their test apparatus.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Conform to Sections of Division 1 as applicable.

1.1.2 Section 230000 shall apply to and govern the work of this Section.

1.1.3 Provide labour, materials, products, equipment and service to complete the Plumbing Specialties and Accessories Work.

2. **PRODUCTS**

2.1 **Plumbing Specialties**

2.1.1 Floor Drains

All floor drains shall be of lacquered iron construction and shall have adjustable top assemblies with grates and frames of material and finish specified. Include lacquered cast iron membrane clamps in areas where waterproofing membrane occurs. Where required or indicated, floor drain bodies shall have12 mm (1/2 in.) trap primer tapping or be installed with fitting between drain and trap.

2.1.2 Floor Drains Finished Areas:

'Smith series 2010A floor drain, all duco coated cast iron body, reversible clamp device and adjustable l27 mm (5 in.) nickel bronze 6mm (¼ in.) thick strainer secured with stainless steel screws, l00 mm (4 in.) throat on strainer. In quarry or mosaic tiled areas, provide square "B" - 125mm x l25mm (5 in. x 5 in.) polished bronze (PB) square strainer. Floor drain with hub provide 2010A-3580NB

2.1.3 Floor Drains - Mechanical Rooms and Unfinished Areas:

Smith series 2320, floor drain, all duco coated cast iron body, seepage flange adjustable collar, clamping device and 200mm (8 in.) diameter grate. Provide backwater valves where shown or required. Backwater valves shall be Smith series 70 12-7022. Where backwater valves are located more than 300 mm (12 in.) below floor level, include an access pit with steel cover and cover frame set in floor of proper depth and size to permit servicing of the backwater valve and running trap.

2.1.4 Floor Drains With Combination Funnel:

Smith series 2320-3591 floor drain, all duco coated cast iron body, seepage flange, adjustable collar, clamping device and 2l2mm (8-1/2 in.) with 100 mm 225 mm (4 in. x 9 in.) oval funnel.

2.1.5 Drain DX Flange

Smith series DX23 12N8 floor drain, duco coated cast iron body DX flooring flange with mounting holes and polished 200 mm (8 in.) diameter nickel bronze 6mm (1/4 in.) thick strainer secured with stainless steel screws on NB frame.

2.2 **Cleanouts**

2.2.1 Cleanouts connected to the drainage system shall be of the same size as pipe up to l00 mm (4 in.) and not less than l00 mm (4 in.) on larger sizes (or as required by Local Code).

2.2.2 Cleanout shall be installed in the building drain as near as practicable to the inner face of the wall through which the drain passed, unless otherwise shown; Where a building trap is inside the building, the cleanout shall be installed at the foot of each vertical sanitary or storm stack; At the ends of all drainage lines and at all changes of direction 45 degrees or more. Cleanouts in horizontal drainage lines shall be at the intervals of not more than 15m (50 ft.).

2.2.3 Wherever possible, cleanouts shall be installed so as to provide access from the finished floor.

2.2.4 Cleanouts, in finished areas shall have cast iron bodies with anchor flange and adjustable round satin nickel bronze tops with scoriated cover or covers to match flooring as specified below:

2.2.5 Line Cleanouts shall be:

Smith series 4420 line cleanout, in cast iron pipe with taper thread cover secured to body with full size pipe opening.

2.2.6 Stack Cleanout shall be:

Smith series 4510 stack cleanout in base, of cast iron stacks with neoprene gasketed secured cover. Where cleanouts are concealed behind finished walls access shall be made by 4530 round stainless steel plate and slotted flat head stainless steel screws.

2.2.7 Floor Cleanouts:

2.2.7.1 In Unfinished Areas and Outside Areas:
Smith series 4220 floor cleanout, duco coated cast iron body with integral clamp device, and removable positive seal closure plug and heavy duty l50 mm (6 in.) adjustable cover 'secured with stainless steel screws.

2.2.7.2 In Tiled Areas:
Smith series 4140 floor cleanout, same as above with square nickel bronze cover and frame recessed for tile. Cover can be adjusted to suit floor lines when installing finished floor

2.2.7.3 In Terrazzo Areas:
Smith series 4180 floor cleanout, same as above with square nickel bronze cover and frame recessed for terrazzo. Cover can be adjusted to suit floor lines when installing finished floor.

2.2.7.4 In Carpeted Areas:
Smith series 4020Y floor cleanout, same as above with nickel bronze cover and frame.

2.2.7.5 For Heavy Traffic Areas:
Smith series 4100 floor cleanout same as above with extra heavy nickel bronze cover and frame.

2.3 **Trap Seal Primer**

2.3.1 Provide a trap seal primer on all floor drains. Primer shall have integral vacuum breaker and 12 mm (1/2 in.) copper to copper connections. Connect primer to nearest frequently used cold water supply. Provide access cover to primer.

2.4 **Air Chambers**

2.4.1 Air chambers at least 500mm (20") long on supplies at each fixture or water connections of same size as supply pipe, minimum 18mm (3/4 in.).

2.5 **Plumbing Traps**

2.5.1 Provide plumbing trap on each fixture, floor drain and drain outlet as required by Code.

2.5.2 Provide cleanouts or accessible traps.

2.6 **Backflow Preventer Assemblies**

2.6.1 Provide complete reduced pressure principle type assembly where contamination of domestic water may occur, consisting of pressure differential relief valve, located between two sitive seating replaceable check valves with stainless steel seats. Provide shut-off valves before and after check valves and test cocks. Assembly shall meet AWWA requirements and CSA B64.4 Standards. Provide strainer between gate valve and first check valve on units 50 mm (2 in.) and smaller (Watts Series 909). Provide funnel complete with 18 mm (3/4 in.) drain pipe under the backflow preventer and terminate pipe at floor drain.

2.6.2 Generally1 backflow preventers are required at:

2.6.2.1 Fire truck filling connection.

2.6.2.2 Interior hose bibbs.

2.6.2.3 Janitors sink.

2.6.2.4 and as may be requested by Plumbing Inspector.

3. **EXECUTION**

3.1 **Installation**

3.1.1 Install plumbing specialties as required by Ontario Building Code and as detailed on the drawings.

3.1.2 Install plumbing specialties in accordance with manufacturer's instructions and as specified.

3.2 **Cleanouts**

3.2.1 In addition to those required by code, and as indicated, install at base of soil and waste stacks and rainwater leaders.

3.2.2 Bring cleanouts out to finished wall or up to finished floor unless accessible behind finish wall or from below finished floor.

3.2.3 Provide line size to maximum 100 mm (4") building drain cleanout and stack base cleanouts.

3.3 **Water Hammier Arrestors**

3.3.1 Install on branch supplies to each fixture or group of fixtures and where indicated.

3.4 **Trap Seal Primers**

3.4.1 Install on cold water supply to nearest frequently used plumbing fixture, in concealed space to approval of Engineer.

3.4.2 Install soft copper tubing to floor drain.

3.5 **Strainers**

3.5.1 Install with sufficient room to remove basket.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Conform to Sections of Division 1 as applicable.

1.1.2 This Section shall apply to and govern the work of all Sections of Division 23.

1.2 **Definitions**

1.2.1 Wherever the words "indicated", "shown", "noted", "listed", or similar words or phrases are used in the Specification they shall be understood, unless the context otherwise provides, to mean that material or item referred to is "indicated", "shown", "listed", or "noted" on the Drawings.

1.2.2 Wherever the words "approved", "satisfactory", "as directed", "submit", "permitted", "inspected" or similar words or phrases are used in the Specification they shall be understood, unless the context otherwise provides, to mean that material or item referred to shall be "approved by", "inspected by" the Architect/Engineer.

1.2.3 The term "provide" where used shall be understood to include labour, materials and services necessary to supply and install the item or work referred to.

1.3 **Quality Assurance**

1.3.1 Requirements of Regulatory Agencies

1.3.1.1 The chemical, physical properties and the design, performance and characteristics of items of Division 23 shall be as specified and in accordance with the requirements and recommendations of the latest issue of the applicable standards and codes of the:

.1 National Standards of Canada - N.S.Can.
.2 Canadian General Standards Board - Can. S.B.
.3 Canadian Standards Association - C.S.A.
.4 American National Standards Institute - A.N.S.I.
.5 American Society for Testing and Materials - A.S.T.M.
.6 American Society of Mechanical Engineers - A.S.M.E.
.7 Provincial Regulation (Building Code) latest edition
.8 Provincial Regulations respecting Plumbing
.9 Local Fire Codes
.10 Provincial Ministry of Labour

1.3.2 Permits, Fees and Certificates

1.3.2.1 Give notice, obtain all necessary permits, pay fees for new street connections, and furnish certificates as evidence that the work installed conforms with the laws and regulations of all governing authorities, before the final certificate of payment is issued. Determine detailed requirements of local authorities having jurisdiction and conform to those requirements.

1.4 **Submittals**

1.4.1 Shop Drawings

1.4.1.1 Submit shop drawings as requested by Architect/Engineer, and as defined in the General Conditions of the Contract.

1.4.1.2 When equipment and apparatus of one system must be co-ordinated with, or installed in a given area with equipment and apparatus of other system (s), this Division shall prepare and submit for review necessary Drawings.

1.4.1.3 Drawings must have manufacturers names, or supplier's name complete with phone numbers and names of contacts, catalogue model numbers, name of trade supplying same, identification number, all pertinent selection criteria such as air flow, noise, heat input/output, etc., otherwise they will be returned.

1.4.1.4 Do not have equipment delivered to site until a Shop Drawing for the item has been reviewed and approved.

1.4.2 As-built Drawings

1.4.2.1 Record, as the work progresses, on one set of white prints provided by Architect/Engineer, all changes or deviations in the location of pipes, valves, sizes of pipes, location of apparatus or equipment and such other approved changes, that occur during progress or work.

1.4.2.2 Provide at completion of work one final set of Drawings with all changes correctly marked in red ink.

1.4.2.3 Where piping is buried dimension location with respect to building walls and mark levels with respect to the elevation of finished floor below which piping is buried.

1.4.3 Maintenance Data and Operating Instructions

1.4.3.1 Assemble equipment literature (cuts), operating instructions, maintenance instructions, parts lists of items frequently requiring replacements, and other pertinent data and submit three sets. Place each set in a three ring binder and submit to Architect/Engineer for approval. Make changes or submit additional information if required to secure approval. Review instructions with the Architect/Engineer to ensure a thorough understanding of the equipment and its operation.

1.4.4 Valve Directory

1.4.4.1 Provide, in duplicate, a neat typewritten directory giving the valve "Number" and "Service" of each valve and the location.

1.4.4.2 Upon Architect/Engineer's approval, enclose one approved valve directory under glass, in a neat, polished 460 mm x 610 mm hardwood frame, complete with mounting clips.

1.5 **Job Conditions**

1.5.1 Examination

1.5.1.1 Examine the site and the Contract documents in accordance with this document.

1.6 **Detail Drawings And Instructions**

1.6.1 Submit notification of locations where installation of fixtures, fittings and equipment would interfere with interior treatment and use of building. Detail drawings or instructions exactly locating these items will then be issued.

1.6.2 Drawings showing the Work do not show every structural detail and are diagrammatic only. Take any information involving accurate measurements of building from Architectural Drawings or at building.

1.6.3 Equipment dimensions are based on first or top named manufacturer. Dimensions of items by other manufacturers shall not exceed available space with necessary allowance for service and maintenance.

1.6.4 Make necessary changes to runs of piping, ductwork and raceways to accommodate structural conditions. Location of pipes, ductwork, raceways and equipment may be altered without additional charge or expense to Contract or Owner providing such change is made before installation of items involved. Such changes will be authorized by ratified site instructions and shall be recorded on Record Set of Drawings.

1.6.5 The general location and route to be followed by pipes, ductwork, and raceways is indicated on drawings. Install these items to conserve headroom and interfere as little as possible with the free use of space through which they pass.

2. **PRODUCTS**

2.1 **Materials**

2.1.1 General: Materials, plant and equipment specified shall form the basis of the Tender and Contract. "The term" or "approved equal" as defined in General Conditions of the Contract, shall be considered to be applied to all items specified in Division 15 unless specifically stated otherwise. See General Instructions, for other conditions.

2.1.2 Access Doors for Ceilings and Masonry Walls: 2.779 mm (12 gauge) steel, prime coated, key locked type, concealed hinges, size 460 mm x 460 mm unless otherwise

noted on Drawings.

2.1.3 Pipe Sleeves: "Schedule 40" in accordance with A.N.S.I. Specifications, black steel pipe of two sizes larger than the sleeved pipe for pipe sizes 100 mm (4") and less in diameter, and one pipe size larger than the sleeved pipe for pipe sizes 127 mm (5") and over in diameter for un-insulated pipe. For insulated pipe sleeve sizes shall be required.

2.1.4 Plate Flanges: Chrome plated for split type, where exposed pipes pass through finished floor, walls and ceilings. Fit plates with substantial hinges and positive latches.

2.1.5 Inserts for Pipe Hangers and Other Similar Items: Manufactured by Canadian Fastening Systems or Truscon Steel Company of Canada Ltd.

2.1.6 Belt Guards: All belt driven equipment shall be supplied with expanded metal belt

2.2 **Standard Of Materials**

2.2.1 Materials and equipment are specifically described and named in this Specification to establish a standard of material and workmanship.

2.2.2 Materials required for the performance of the work shall be new and the best of their respective kinds and of uniform pattern throughout work.

2.2.3 Materials shall be of Canadian manufacture where obtainable. materials of foreign manufacture, unless specified, shall be approved before being used.
Equipment items shall be standard products of approved manufacture. Identical units of equipment shall be of same manufacture. In any unit of equipment, identical component parts shall be of same manufacture, but the various component parts comprising the unit need not be of one manufacturer.

2.2.4 Materials shall bear approved labels as required by Code and/or Inspection Authorities.

2.2.5 Chemical an physical properties of materials and design performance characteristics and methods of construction and installation of items of equipment, specified herein, shall be in accordance with the latest issue of applicable Standards or Authorities when such are either mentioned herein, or have jurisdiction over such materials or items of equipment.

2.2.6 Install materials in strict accordance with manufacturer's recommendations.

2.2.7 Include items of material and equipment not specifically noted on Drawings or mentioned in Specifications but which are necessary to make a complete and operating installation.

2.2.8 Confirm capacity and ratings of equipment being provided, when based on ratings of equipment being provided under other trade Sections, before such items are purchased.

2.2.9 Remove materials, condemned as not approved for use, from job site and deliver and install suitable approved materials in their place.

3. **EXECUTION**

3.1 **Preparation**

3.1.1 Cutting and Patching

3.1.1.1 Cutting of holes up to 200 mm in diameter and related patching shall be done under this Division. Holes and other openings larger than 200 mm in diameter, all chases, bulkheads, furring and related patching will be done under Cutting and Patching. Read the same for detailed information regarding cutting and patching.

3.2 **Installation**

3.2.1 General

3.2.1.1 Instruct and supervise other Sections doing related work for Division 23.

3.2.1.2 Supply the measurements to other Sections to allow for necessary openings to be left in the work of other Sections.

3.2.1.3 Neatly install pipes, ducts and tubing which are to be concealed close to building structure, so that the necessary furring can be kept as small as possible.

3.2.1.4 Correct installed work as directed by authorized inspector of such authorities.

3.2.2 Dissimilar Metals

3.2.2.1 Separate dissimilar by means metals of gaskets or shims of approved material

in order to prevent electrolytic action. Where piping of dissimilar metals is connected, use approved dielectric unions or couplings. A brass fitting or brass valve may be used in making connections between copper and steel piping.

3.2.3 Electrical

3.2.3.1 This Division shall supply and install motors, supply and install starters and supply and install control wiring, for all motor driven equipment of this Division.

3.2.3.2 All electrical work done by this Division shall be done in accordance with the requirements of Division 26.

3.2.4 Excavating, Backfilling and Rough Grading

3.2.4.1 Excavating, backfilling and rough grading for mechanical work, located inside and outside of Building where indicated on Mechanical Drawings and as required for mechanical installations shall be provided for in Excavating, Backfilling and Rough Grading Section, unless otherwise noted.

3.2.5 Equipment Supports and Bases

3.2.5.1 Mount base mounted equipment on chamfered edge housekeeping pads a minimum of 100 mm high and 50 mm larger than equipment dimensions all around. Concrete specified in Cast-in-Place Section.

3.2.5.2 Supply and erect special structural work for the installation of mechanical and electrical equipment. Provide anchor bolts and other fastenings unless noted otherwise.

3.2.5.3 Mount equipment required to be suspended above floor level, where details are not shown on a frame or platform bracketed from the wall, or suspended from ceiling. Carry supports to either the ceiling or the floor, or both as required, at locations where, because wall thickness is inadequate, it is not permitted to use such brackets.

3.2.5.4 Electrical panels, switches or other mechanical or electrical equipment shall be complete with suitable bases or mounting brackets. Install angle or channel iron supports to bear the equipment where it is shown on, or in structural tile walls, or walls inadequate to bear the equipment.

3.2.5.5 Concrete bases for mechanical equipment which do not require vibration isolation mountings, shall conform to the following table unless otherwise specified or shown:

Equipment kW	Thickness of Base
Up to 7.5	150mm (6")
11 to 19	250 mm (10")
22 and over	300 mm (12")

3.2.5.6 Dowel concrete bases in direct contact with floor slab into concrete floor slab with not less than 13 mm (1/2 in) diameter steel rods. Fasten rods to floor slab reinforcing steel before pouring.

3.2.5.7 Set equipment base plates on a minimum 13 mm (1/2 in) grout and fill hollow portion of base with concrete.

3.2.5.8 Support coils in air supply units by means of a structural steel frame at least 600mm (24 in) for water coils and 900 mm (36 in) for steam coils, above finished floor unless otherwise shown.

3.2.5.9 Support hangers in general, from inserts in concrete construction or from building structural steel beams, using beam clamps. Provide additional angle or channel steel members, required between beams for supporting pipes and conduits.

3.2.5.10 Provide any additional supports required from existing concrete construction for any piping or equipment, by drilling same and installing expansion cinch anchors.

3.2.6 Supports and Hangers

3.2.6.1 Pipe supports and hangers shall be approved type, properly located and installed to give adequate support without excessive sway or vibration, and to

provide freedom of movement for thermal expansion. Support horizontal piping at intervals in accordance with the requirements of applicable Codes and Regulations or as specified under the applicable mechanical Section. Hangers, unless otherwise specified, shall be adjustable wrought steel clevis type with supporting nut and upper lock nut.

3.2.6.2 Pipe hangers, where pipe is to be insulated, shall fit around the outside of the pipe insulation. Protect insulation by shields and saddles. On domestic hot and cold water and insulated drainage piping protection by means of sheet metal shields will be accepted. Bare copper piping shall have a single thickness of packing between the copper pipe and its hanger or support.

3.2.6.3 Trapeze type hangers may be used where pipes are grouped together, consisting of a substantial horizontal steel angle or channel provided with adjustable steel rods, fitted approved beam clamps or rod with supporter nut and a second locknut.

3.2.7 Sleeves

3.2.7.1 Floor sleeves and tubes shall have a minimum 15 mm lip on the upper side or as shown on Drawings.

3.2.7.2 Make openings around sleeves and tubes in interior walls and partitions tight to stop drafts and to reduce sound transmissions and make openings around sleeves and tubes in floors watertight.

3.2.8 Water, Waste and Vent Pipe and Connections to Equipment

3.2.8.1 Provide domestic water and waste piping and connections to apparatus and equipment installed under Sections requiring such piping and connections.

3.2.8.2 The Section supplying such apparatus and equipment shall supply and deliver to the building, for installation under the Mechanical Division, all valves and controls required for water and drain piping adjacent to the equipment. Full instructions concerning the proper installation shall also be provided.

3.2.8.3 Install water and waste piping and connections, valves and controls supplied with equipment, in strict accordance with shop drawings and equipment supplier's further instructions.

3.2.9 Identifications of Valves

3.2.9.1 Identify valves by means of approved brass tags bearing embossed black numbers.

3.2.10 Locating Pipework

3.2.10.1 Layout and install piping, valves, fittings, and cleanouts in conveniently accessible pipe spaces to facilitate easy maintenance.

3.2.10.2 Establish the location of each access door before the installation of piping. Install access doors where valves, gauges, indicators and adjustable or maintenance items are concealed.

3.2.10.3 It would be advantageous for maintenance work, offset, arrange piping close to the wall.

3.2.10.4 Install piping to be insulated with sufficient clearance and space to allow the installation of insulation.

3.2.11 Underground Installation

3.2.11.1 Bury underground piping in such a manner that at no time will it be in contact with ashes, cinders or other harmful materials. Lay pipe lines straight and in true alignment to the slopes of the pipe as indicated on the Drawings or directed by the Architect/Engineer.

3.2.12 Above Ground Installation

3.2.12.1 Install piping along straight lines running parallel to walls and partitions and concealed as much as possible. Offset pipe lines around columns, beams, ducts and other obstructions as required, and:

3.2.12.2 In Finished Areas: Conceal piping in partitions as in spaces to be made for the purpose, and where groups of pipes are run in such spaces, evenly space and neatly arranged to that the best use of the space is made and where these

groups are valved, arrange valves either in equally spaced steps or in straight rows.

3.2.12.3 In Unfinished Areas: Run piping exposed, neatly grouped in runs with other piping in such a manner that no interference between different piping and devices occurs and with as few crossovers and offsets as possible.

3.2.12.4 In Pipe Spaces Where Entry of Maintenance Personnel is Intended: Locate large diameter piping farthest from entrance.

3.2.13 Expansion and Contraction

3.2.13.1 Make proper allowance for thermal expansion and contraction. Erect piping and equipment in such a manner that the strain and weight does not come upon cast connections, fittings and apparatus.

3.2.14 Painting Work Supplied under Mechanical Division

3.2.14.1 Equipment with standard factory applied baked enamel finish. Appropriate Sections of Division 23 shall touch up minor damage to finish. Items suffering major damage to finish, if too extensive to be remedied by touch up in Architect's/Engineer's opinion, shall be entirely replaced.

3.2.15 Disconnection and Demolition of Existing Work

3.2.15.1 Disconnect and seal off mechanical equipment and services as required on the Site.

3.2.15.2 Be responsible for demolition and removal of mechanical equipment, and services designated for removal on Drawings and as required by work, unless otherwise specified under Demolition Section.

3.2.15.3 Mechanical work being removed under Demolition Section shall be carried out under direction of this Division. Do all disconnecting and capping prior to authorizing removal.

3.3 **Field Quality Control**

3.3.1 Temporary and Trial Usage

3.3.1.1 Temporary and Trial Usage by Owner of any mechanical or electrical device, machinery, apparatus, equipment or any other work or materials supplied before final completion and written acceptance shall not be construed as evidence of acceptance of same by Owners.

3.3.1.2 Owners shall have the privilege of Temporary or Trial Usage, as soon as Contractor shall claim that said work is completed and in accordance with Drawings and Specifications, for such reasonable length of time as is deemed to be sufficient for making a complete and thorough test of same. Claims for damage shall not be made by Contractor for the injury or breaking of parts of work which may be used, whether caused by weakness or inaccuracy of structural parts of by defective materials or workmanship of any kind whatsoever.

3.3.2 Balancing, Adjusting and Start-up

3.3.2.1 Conduct acceptance tests to demonstrate that the equipment and systems meet the specified requirements. Conduct tests as soon as conditions permit. Make changes, adjustments or replacements required as the preliminary tests may indicate prior to final tests.

3.3.2.2 Operate equipment for a minimum period of five days. Repair defects and repeat tests until satisfactory. Lubricate bearing; adjust and set direct drives and `V' belt drives for proper alignment and tension; calibrate and adjust thermostats, thermometers, linkages and dampers; operate and test motors and speed switches for correct working sequences, check overload heaters in motor starters; replace and clean filters, flush out lines and equipment, remove and clean strainers; fill water systems and purge air; clean the fan wheels, heating coils, fasten loose and rattling pieces of equipment.

3.3.2.3 Vary loads to illustrate start-up sequence, normal shut down, and simulate emergency conditions for safety shut down, with automatic and manual reset.

3.3.2.4 Conduct final tests in the presence of the Architect/Engineer. Give the Architect/Engineer advance notice in writing that the preliminary test have been completed and that final tests are ready to be carried out. During the final tests demonstrate to the satisfaction of the Architect/Engineer that all equipment is operating as intended without undue noise and vibration.

3.3.2.5 Supply services of trained specialists, ladders, tools and associated equipment to assist the Architect/Engineer in carrying out final tests.

3.3.2.6 Balance and submit reports on all air systems, and submit reports for approval on fan speed, motor speed, static heads (design and actual), motor current draw and voltage, temperature changes on air side, air pressure drops on coils. filters etc.

3.3.2.7 Furnish three copies, in typewritten form, of above reports along with check list noting the tests and adjustment that were made to each piece of equipment.

3.3.2.8 Check the function of the control system and work with, Controls Section to obtain optimum performances.

3.3.2.9 Take sound tests as required by the Architect/Engineer.

3.3.2.10 Take vibration tests as required by the Architect/Engineer.

3.3.2.11 Investigate malfunctions and report to the Architect/Engineer.

3.3.2.12 Work of Division 23 shall be incomplete until the Architect/Engineer approves the Testing and Balancing Report.

3.3.2.13 Air balancing traverses must be made even on propeller fans.

3.3.2.14 Show all the location of all traverse points in report documents.

3.3.3 Testing of Piping Systems

3.3.3.1 Test all piping systems for leaks providing gauges, materials and labour as required. Equipment furnished as part of the permanent installation shall not be used for testing purposes. Before testing remove all equipment which is not designed to withstand the test pressures. Test all piping before covering is applied, before backfilling or concealing.

3.3.3.2 Hydrostatic Test: On all tested pressure piping maintain test pressure for six consecutive hours, during which time the pressure test shall remain constant without pumping.

3.3.4 Operating Instructions

3.3.4.1 Supply the services of a trained specialist to thoroughly explain each mechanical system, its operation and its maintenance to the full satisfaction of the Architect/Engineer. Each system is to be started in its proper sequence in the presence of the Architect/Engineer.

3.3.5 Cleaning and Final Adjustments

3.3.5.1 Clean mechanical systems daily. See General Requirements, article "Clean-up".

3.3.5.2 Clean interior and exterior of all systems including strainers, and vacuuming of interior of ductwork and air handling units.

3.3.5.3 Clean and refurbish all equipment and leave in first class operating condition including replacement of all filters in all air and piping systems.

3.3.5.4 Balance and adjust all systems and each piece of equipment to operate efficiently.

3.3.5.5 Supply lubricating oils and packing as required for proper operation of equipment and systems until work has been accepted.

3.3.6 Final Inspection

3.3.6.1 Request in writing for a final inspection of mechanical systems.

3.3.6.2 Do not submit this written request until:

.1 Deficiencies noted during job inspections have been completed. Systems have been balanced and tested and are ready for operation.

.2 Balancing reports have been submitted and approved.

.3 Completed data books have been submitted and approved.

.4 Tags are in place, valve charts and line diagrams have been submitted and approved, and equipment identification is completed.
.5 The cleaning up is finished in every respect.
.6 Certificates are hung.
.7 Spare parts and replacement parts specified have been provided and receipt of same acknowledged.
.8 Record drawings are completed and approved.
.9 Owner's operating personnel have been instructed in operation of systems.

3.4 **Appliances**

3.4.1 Provide any extension cords, lamps and miscellaneous materials, temporarily required for carrying out work.

3.5 **Correction After Completion**

3.5.1 Submit an written guarantee to Owner covering the remedy of defects in the work at completion of work but before issue of final Certificate. This guarantee shall in no way supplant any other guarantee of longer period called for on certain equipment or materials.

3.5.2 Submit a similar guarantee for one year from date of acceptance for any part of work accepted by Owner, before completion of whole work.

3.6 **Protection Of Work And Property**

3.6.1 Each trade shall protect its own and other trade's finished and unfinished work from damage, due to the carrying out of its work. Cover floors and other work with tarpaulins, if required, for this purpose. Each trade shall issue responsibility for repairing damage to floor and wall surfaces resulting from its failure to provide such protection. Carry out such repairs in a satisfactory manner without expense to Owner.

3.7 **Certificates And Payments**

3.7.1 Arrange and pay for permits, test, Certificates of Inspection and street connections required for the work. Submit applications requiring owner's signature before commencing work. Do work in compliance with applicable laws, rules, ordinances and regulations.

3.7.2 Inspection Certificates, as applicable, shall be submitted before final Certificate will be issued:

3.7.2.1 Electrical Inspection.
3.7.2.2 Plumbing Inspection.
3.7.2.3 H.V.A.C. Inspection.
3.7.2.4 Sprinkler System Inspection.

3.7.3 Department of Labour Certificates shall be renewed as necessary to remain in force for the guarantee period.

3.8 **Office And Storage**

3.8.1 Provide temporary office, workshop and tools and material storage space for the work and assume responsibility for any loss or damage thereto Buildings erected for this purpose shall conform in appearance to those erected for similar purposes, under other Divisions of Specification. Provide heat, light and telephone for the buildings.

3.9 **Coordination**

3.9.1 Work of each trade shall be laid out so that it does not conflict with work under other Divisions of Specification. Make good damage to Owner's property or other trade's work caused by improper locating or carrying out of work.

3.9.2 Prepare field drawings, based on manufacturer's shop drawings, whenever necessary or requested to show location of major equipment and relative position of various services.

Arrange layouts with due regard to maintenance. Obtain approval of these field drawings before proceeding with work involved. Draw field drawings to a scale 1:50, 1:20 (1/4in, 1/2in).

3.9.3 Install services and equipment which are to be concealed, as close as possible to building structure so that necessary furring can be kept to minimum dimensions.

3.10 **Provision For Future**

3.10.1 In every place where a space is indicated as being reserved for future equipment or for a future extension to building, leave such space clear and install piping, raceways and equipment in such a manner that necessary connections can be made to the future apparatus or building. Make such provision for future in close consultation with Owner's representative. Properly identify terminations for such services on Record Set of Drawings.

3.11 **Moving And Setting In Place Of Owner's Equipment**

3.11.1 Items on drawings marked S.B.O. (Supplied by Owner) will be purchased by Owner. Contractor will receive, check. store and give receipt for and be responsible for such items. Contractor will also unpack, uncrate and assemble such items, locate then at building where required and build them in as necessary. Provide service connections and wiring, as necessary.

3.12 **Temporary Heating**

3.12.1 Temporary heating required while building is under construction will be provided under Division 1.

3.12.2 Permanent heating units and radiation may be used for temporary heating by the Contractor, providing this equipment is installed in its permanent location and providing that building is completely closed in.

3.12.3 Contractor under Division 1 will be responsible for the operation, care and maintenance of the permanent heating system when used for temporary heating. Permanent heating equipment used for temporary heating will be thoroughly cleaned and put in first class approved operating condition and appearance by the Contractor at completion of job and prior to final acceptance by Owner. Damaged equipment and piping will be replaced by Contractor in an approved manner.

3.13 **Location Of Services**

3.13.1 Location of floor drains, hub drains, combination drains, sprinkler heads, grilles and diffusers, and other services shall be subject to change, without extra cost to Owners/Contract provided information is given prior to installation.

3.13.2 No extra amount will be paid for extra labour and materials for relocating above items and services up to 3m (10 ft.) from their original location nor will credits be anticipated where relocation up to 3m (10ft.) reduces material and labour.

3.13.3 Other cases will be considered on their individual merits.

3.14 **Welding**

3.14.1 Welding of pressure piping shall be carried out by welders certified for pressure piping by the Boiler Inspection Branch, Ministry of Labour, Ontario. Welders shall stamp their welds with their identifying number. Welding procedures used on job shall be approved by Ministry of Labour.

3.14.2 Welders Certificates and approved welding procedures shall be on job site at all times for inspection.

3.14.3 The above requirements shall apply to piping carrying hot water, chilled water, or compressed air, at pressures greater than 105 kPa (15 psi). In addition, piping carrying these fluids or gases at pressures over 350 kPa (50 psi) shall be subject to inspection, and covering shall not be applied until inspection has been carried out.

3.14.4 Welding, both shop and field, shall preferably be electric arc and in accordance with the

recommendations of the Canadian Welding Bureau.

3.14.5 Welds shall be a solid homogeneous part of the metals joined and free from pits and incorporated slag and scale. Surface of welds shall be smooth and regular and shall be full area indicated or required to develop the strength of the joint.

3.14.6 Upon receipt of Contract, immediately forward two sets of Drawings to Chief Inspector, The Boiler Inspection Branch, Ministry of Labour, Ontario. Advise in writing, when Drawings are dispatched to Inspection Authority. Pay charges incurred for inspection.

3.15 **Link Seals**

3.15.1 Seal the void between sleeve and bare pipe passing through outside foundation walls for floors on grade with link seals:

3.15.1.1 Standard of Acceptance:

"Thunderline Linkseal" as distributed by Corrosion Services Co. Ltd.

3.15.2 Seals shall be modular mechanical type consisting of interlocking synthetic rubber links shaped to continually fill the annular space around the outside of the pipe.

3.15.3 Links shall be loosely assembled with bolts to form a continuous rubber belt around pipe, with a pressure plate under each bolt head and nut.

3.15.4 Determine the inside diameter of each individual wall opening or sleeve as applicable before ordering, fabricating or installing the appropriate sized seal.

3.15.5 After seal is correctly positioned, tighten seal bolts to expand rubber links and provide watertight seal. Seal shall be constructed and installed to provide electrical insulation between pipe and wall.

3.16 **Corrosion Protection Anodes**

3.16.1 Provide external corrosion protection anodes for buried cold water and fire protection ductile iron water mains, fittings, hydrants and metallic services as required.

3.16.2 Sacrificial anode material shall be made of high grade electrolytic zinc, 99.99% pure, and conform in composition to ASTM B-4-418-67 type II on anodes used underground.

3.16.3 Anodes shall be supplied with a 5 mm (3/16 in) diameter minimum steel core complete with #8 TWH stranded connecting wire or bolt-on strap connection where required.

3.16.4 Zinc anodes shall be packaged in low resistance backfill material such as gypsum, and/or bentonite to increase current output in high resistivity platforms to carry a live load of 7.5 kPa (150 lb/ft2) uniformly distributed. The structural members shall be supported form the building structure in an approved manner.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Conform to Sections of Division 1 as applicable.

1.1.2 Section 230000 shall apply to and govern the work of this Section.

1.1.3 Provide labour, materials, products, equipment and service to complete the Testing, Adjusting and Balancing (TAB) Work.

2. **PRODUCTS**

2.1 **Materials**

2.1.1 A list of the equipment to be used with serial number and date of recent calibration for this project shall be submitted for approval by the Architect/Engineer.

2.1.2 Provide calibration histories for each instrument when accuracy of readings is questionable. Instruments shall be in good condition, recently calibrated and where requested shall be recalibrated by an independent testing agency before proceeding with work.

3. **EXECUTION**

3.1 **Definition and Requirements**

3.1.1 TAB means to test, adjust and balance all systems, including equipment, to perform in accordance with Contract Documents.

3.1.2 The total system balance shall be strictly performed in accordance with the latest edition of the Associated Air Balance Council (AABC) National Standards, 1982 for the total system balance and in accordance with the scope of work specified in the Contract Documents.

3.1.3 Follow start-up procedure as recommended by manufacturer.

3.1.4 Special start-up procedures may be specified elsewhere.

3.1.5 TAB firm shall cooperate with the Architect/Engineer and all subcontracting firms to ensure all systems are left in approved working order to the satisfaction of the Architect/Engineer and the construction schedule prepared by the General Contractor met.

3.1.6 Any abnormal conditions in the mechanical system or conditions which prevent the total system balance shall be reported in writing to the General Contractor for immediate review and resolved to the satisfaction of the Architect/Engineer.

3.1.7 Pre-construction plan check and two mechanical construction reviews shall be provided by the TAB firm.

3.1.8 Ensure that all necessary devices i.e. pitot tube caps, snap-in test plugs, etc. necessary for the satisfactory completion of his work. Advise the various subcontractors in writing where test connections are required for connection to his test apparatus.

3.1.9 TAB to apply to the following systems, equipment and related controls:

3.1.9.1 Air handling

3.1.9.2 Duct leakage testing.

3.2 **Reference Standards**

3.2.1 Do TAB complete mechanical systems over entire operating range in accordance with most stringent conditions of selected standard.

3.2.1.1 AABC - Associated Air Balance Council

3.2.1.2 ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers.

3.2.1.3 SMACNA - Sheet Metal and Air Conditioning Contractors National Association.

3.2.1.4 Specifications herein or elsewhere in Contract Documents.

3.2.2 Start TAB only when building is essentially completed, including:

3.2.2.1 Installation of ceilings, doors, windows and other construction affecting TAB.

3.2.2.2 Application of sealing, caulking, and weather stripping.

3.2.2.3 Normal operation of mechanical systems affecting TAB.

3.3 **Duct Leakage Testing**

3.3.1 Air duct systems shall be tested to ensure duct leakage does not exceed prescribed limits.

3.3.2 The following duct systems shall be tested:

3.3.2.1 All toilets exhaust ductwork (low pressure)

3.3.2.2 All conditioned supply ductwork (low pressure) from air handling units.

3.3.2.3 Ductwork from variable volume boxes.

3.4 **The Ductwork Shall be Tested as Follows**

3.4.1 Low pressure supply, exhaust ductwork shall be tested at 500 Pa. w.g. static pressure with a maximum leakage rate of 1.5 per cent.

3.4.2 Casing plenums (air supply units) under positive pressure shall be tested at 1.50 kPa w.g. with a maximum leakage of 0.5 per cent.

3.5 **Accuracy**

3.5.1 Do TAB to within plus or minus (5 per cent) of design values for low/medium ductwork and 2.5 per cent of design valves for high pressure ductwork.

3.5.2 Measurements to be accurate to within plus or minus (2 per cent) of actual values. Instrument calibration: To be in accordance with referenced standard, but within three months of commencement of TAB.

3.6 **Report**

3.6.1 Format to be in accordance with referenced standard listed above, but using SI units, or imperial units as applicable.

3.6.2 Produce "as-built" full system schematics. Use as-built drawings for references.

3.6.3 Submit 6 copies of TAB reports, each in "D" ring binders, complete with index tabs for verification and approval of Architect/Engineer.

3.7 **Verification**

3.7.1 Reported measurements shall be subject to verification by Architect/Engineer. Provide instrumentation and manpower to verify results of up to 15 per cent of all reported measurements. Number and location of verified measurements to be at discretion of Architect/Engineer.

3.7.2 Bear costs to repeat TAB, as required, to satisfaction of Architect/Engineer.

3.7.3 Settings: Lock and permanently mark settings as required by reference standard.

3.8 **Completion**

3.8.1 TAB to be considered complete only when final reports are approved by Architect/Engineer.

3.9 **Air Moving Systems**

3.9.1 Measurements shall be done as required by referenced standards, including, but not limited to the following:

3.9.1.1 Air velocity.

3.9.1.2 Static pressure.

3.9.1.3 Velocity pressure.

3.9.1.4 Temperature: Wet bulb and Dry Bulb

3.9.1.5 Cross sectional area.

3.9.1.6 Rpm.

3.9.1.7 Electrical power: Voltage, Current draw.

3.9.2 Location of Equipment Measurements:

3.9.2.1 Inlet and outlet of each:

.1 Fan

.2 Coil

.3 Filter
.4 Damper
.5 Other auxiliary equipment.

3.9.3 Location of system measurements at: (as applicable)
3.9.3.1 Main ducts
3.9.3.2 Main branch ducts
3.9.3.3 Sub-branch ducts
3.9.3.4 Each supply, exhaust and return air inlet and outlet.
3.9.3.5 Other auxiliary equipment
3.9.3.6 All areas served by system.

3.10 **Execution of Work**

3.10.1 Use calibrated venturi tubes, orifices or other metered fittings and pressure gauges in conjunction with permanent and portable type flow meters to determine flow rated for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.

3.10.2 Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.

3.10.3 Effect system balancing with automatic control valves fully open to heat transfer elements and bypasses fully closed.

3.11 **Fan Performance Assessment**

3.11.1 Air quantity shall be measured by taking anemometer traverses across a cooling coil, a heating coil, or at filter bank or by pilot tube traverses in the fan suction or discharge plenum.

3.11.2 Static pressure difference between fan inlet and discharge, motor amperage and fan rpm shall be measured and motor kW shall be determined from an appropriate curve showing kW, as a function of motor amperage for that particular motor.

3.11.3 The results of these measurements shall be plotted on the fan characteristic curve supplied by the fan manufacturer and the air volume, static pressure and rpm lines should form a triangle enclosed by a rectangle with a vertical dimension not more that 15 per cent of rated static pressure and a horizontal width of not more than 10 per cent of rated air volume. The kW taken from the fan characteristic shall be within 10 per cent of the kW given by the motor amperage readings.

3.11.4 If required precision is not obtained with first set of measurements, readings shall be repeated. If subsequent readings show that the specified precision is unobtainable, fan manufacturer shall submit a report indicating reason for unpredicted performance of fan, and provide a new characteristic curve showing actual performance of the fan as installed.

3.11.5 Measurements of static pressure loss across cooling coils, heating coils and filter banks shall be taken and tabulated with manufacturer's published pressure loss ratings at the established fan air volume.

3.12 **Exhaust or Return System Balancing Procedure**

3.12.1 After related supply systems have been balanced, set outlet dampers on exhaust systems 100 per cent open and relief dampers on return system 100 per cent closed. Open balancing dampers and adjust fan inlet static pressure controllers, or fan speed to obtain design air quantity at most remote outlet. Balance remaining outlets by adjusting dampers. If air quantity at same outlets other that the most remote outlet is less than design, re-adjust fan and rebalance previously adjusted outlets. Measure fan performance and adjust fan speed and inlet guide vane controllers so that return air quantity is equal to supply air quantity less fixed exhaust air quantities, with 10 per cent allowance for pressurization.

3.13 **Fresh Air Adjustment Procedure**

3.13.1 After adjustment of supply, return and related exhaust fans, adjust minimum fresh air damper position to obtain fresh air quantity. Damper position shall be determined by measurement of outside, return and mixed air temperatures and confirming calculations shall be included in balance report.

3.14 **Branch Air Quantity Measurement Procedure**

3.14.1 Branch air quantities shall be determined using pitot tube traverses in accordance with the procedures outlined in Testing, Balancing and Adjusting of Environmental Systems by William G. Eads, P.E., issued by SMACNA. Measurements shall be taken at each riser as it is connected to fan discharge or suction header and at each floor where branches are taken from riser. Measurement shall be repeated until sum of branch air quantities is within 10 per cent of fan delivery.

3.15 **System Data Report**

3.15.1 Reports shall include balance and equipment data.

3.15.2 Submit 3 copies showing the following, as applicable:

3.15.2.1 L/s flow at each coil.

3.15.2.2 kPa pressure drop across each coil.

3.15.2.3 L/s flow at each heat exchanger.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Conform to Sections of Division 1 as applicable.

1.1.2 Section 23 00 00 shall apply to and govern the work of this Section.

1.1.3 Provide labour, materials, products, equipment and service to complete the Ductwork - Low Pressure work.

1.2 **Work Included**

1.2.1 Work to be done under this section shall include the furnishing of labour, materials and equipment required for installation, testing, and putting into proper operation complete low pressure duct systems as shown, as specified and as otherwise required.

1.3 **Installers**

1.3.1 Sheet metal ductwork and specialties shall be provided by a firm having an established reputation in this field.

2. **PRODUCTS**

2.1 **Classification**

2.1.1 Low pressure ductwork construction classification as follows:

Normal Operating		
Pressure Class PA (IN. W.G.)	Pressure PA (IN.W.G.)	Normal M/S (FPM)
125 (1/2)	up to 125 (1/2)	1.0 (2000)
250 (1)	between 125-250 (1/2 and 1)	12.5 (2500)
500 (2)	between 250-500 (1 and 2)	12.5 (2500)
750 (3)	between 500-750 (2 and 3)	15.0 (3000)
750+(3+)	Class set high-pressure ductwork specification.	

2.2 **Sealant And Tape**

2.2.1 Sealant: Oil resistant, polymer type flame resistant, high velocity duct sealing compound temperature range from minus 30°C to plus 93°C (minus 22°F to plus 200 °F).

2.2.1.1 Standard of Acceptance:

.1 Foster 30-20

.2 Durodyne 5-2

.3 3M Company EC800

2.2.2 Tape: Polyvinyl treated, open weave fiberglass tape, 50mm (2 in.) wide.

2.2.2.1 Standard of Acceptance:

.1 Duro Dyne Ft-2

2.3 **Ductwork General**

2.3.1 Where a standard for ductwork fabrication fittings, joints or supports has not been described, work shall be done as described in current edition of the equipment Volume Handbook by the American Society of Heating Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE) and/or current edition of Duct Construction Standards published by Sheet Metal and Air Conditioning Contractor National Association, Inc.

2.3.2 Drawings for prior approval shall be submitted, if fittings, joints, supports, or seams different from those described and shown or specified are to be used. Submit actual samples or details.

2.3.3 Fabricate ductwork and fittings, (except as otherwise noted) from prime galvanized sheet metal. Quality of material shall be such that sample may be bent flat on itself without fracture of coating or base metal.

2.3.4 Refer to relevant section of SMACNA standards and specify pressure class for gauges

reinforcement and construction details.

2.3.5 Duct elbows shall be unvaned with throat radius equal to duct width. Where shown or required through interference, fabricate with reduced throat radius or square throat both with turning vanes.

2.3.6 Transformations shall be gradual, maximum 20o angle between duct side and direction of flow, diverging maximum 30o angle converging.

2.3.7 Make offsets with full radius elbows or square elbows with full radius turning vanes.

2.3.8 Take branches from main duct with radius tap in, 90o tap in on with converging radius elbow. Provide hinged double thickness splitter damper at each branch in rectangular supply ductwork. Damper shall be constructed of same gauge material as branch duct and have length equal to 1-1/2 times branch duct width. Accessible adjusting rod and clamp.

2.3.9 Brace and stiffen ductwork to eliminate breathing, vibration and sagging and hung rigidly and permanently.

2.3.10 Variations to the given duct sizes will be permitted providing that the equivalent round duct cross sectional area is maintained and provided the revised duct aspect ratio is not greater than 4:1.

2.3.11 Water, steam or other pipes may pass through duct provided the pipe is covered by streamline duplicators and the free area of the duct is maintained.

2.4 **Fittings**

2.4.1 Fabrication: To SMACNA

2.4.2 Radius elbows: Standard Radius and/or short radius with single thickness turning vanes.

2.4.3 Square elbows: To 400mm (16 in.) with single thickness vanes.

2.4.4 Square elbows: Over 400mm (16 in.) with double thickness vanes.

2.4.5 Main supply duct branches with or without splitter damper. If splitter damper is not used provide branch and main duct balancing dampers.

2.4.6 Provide sub branch duct with 45o entry and balancing damper on branch and/or sub branch duct with square connection, extractor and branch duct balancing damper.

2.4.7 Transitions:

.1 diverging: (20^{o}) maximum included angle

.2 converging: (30^{o}) maximum included angle

2.4.8 Offset: square elbows and full radius elbows as indicated.

2.4.9 Obstruction deflectors: Maintain full cross section area. Maximum included angles as for transitions.

2.5 **Galvanized Steel**

2.5.1 Lock forming quality: To ASTM A525M-80, (Z90) zinc coating.

2.5.2 Thickness: To ASHRAE and SMACNA

2.5.3 Fabrication: To ASHRAE and SMACNA

2.5.4 Joints: To ASHRAE and SMACNA and/or proprietary manufactured duct joint. Proprietary manufactured flanged duct joint shall be considered to be a class A seal.

2.5.5 Standard of Acceptance:

.1 Ductmate Convata Ltd. system for proprietary joints.

.2 Exams Nexus for proprietary joints.

2.6 **Hangers And Supports**

2.6.1 Strap Hangers: of same material as duct but next sheet metal thickness heavier than duct.

2.6.2 Hangers configuration: To ASHRAE and/or SMACNA. Maximum duct supported by strap hanger: 500mm (20").

2.6.3 Hangers: galvanized steel angle with galvanized steel rods to ASHRAE and SMACNA following table:

Duct Size	Angle Size	Rod Size

(mm)	(mm)	(mm)
up to 750	25x25x3	6
751 to 1050	40x40x3	6
1051 to 1500	40x40x3	10
1501 to 2100	50x50x3	10
2101 to 2400	50x50x5	10
2401 and over	50x50x6	10

2.6.4 Upper hanger attachments:

2.6.4.1 For concrete: Manufactured concrete inserts. Standard of Acceptance:

.1 Myatt Figure 485

2.6.4.2 For steel joist: Manufactured joist or steel plate washer. Standard of Acceptance:

.1 Grinnell fig. 61 or 86 for joist clamps

.2 Grinnell fig. 60 for plate waster

2.6.4.3 For Steel beams: Manufactured beam clamps. Standard of Acceptance:

.1 Grinnell fig.69

2.6.4.4 Ductwork shall be hung rigidly and permanently at 2.44m (8 ft.) on center as follows:

.1 up to 1.35 width: 1.6 mm strap

.2 1.35 m to 1.52 m: 38 x 38 x 5 mm angle c/w 6 mm rods

.3 1.54 m to 2.13 m: 38 x 38 x 5 mm angle c/w 10 mm rods

.4 2.16 m and over: 50 x 50 x 6 mm angle c/w 12 mm rods

3. EXECUTION

3.1 General

3.1.1 Install ducts in accordance with ASHRAE and/or SMACNA unless otherwise indicated.

3.1.2 Do not break continuity of insulation vapour barrier with hangers or rods. Insulate strap hangers 100mm (4 in.) beyond insulated duct.

3.1.3 Support risers in accordance with ASHRAE and/or SMACNA unless otherwise indicated.

3.1.4 Hammer edges and slips to leave a smooth finished surface inside duct. Extend strap down side and turn duct 50mm (2 in.) fastening securely to side and underside of duct.

3.1.5 Support vertical ducts with angles riveted to duct and bearing on building structure.

3.1.6 Cap ends of unfinished sections of duct unless that particular section is actually being worked on. Continue this protection until plastering, drywall and other finishing operations are completed.

3.1.7 Close inactive ducts with a layer of 6 mil plastic secured by a metal band pulled tight around the duct by means of screws.

3.1.8 Cover open ends or registers of active exhaust ducts with 25mm (1 in.) of filter media secured by a metal band pulled tight around the duct by means of screws. Maintain this media until plastering, drywall and other finishing operations are completed.

3.2 **Hangers**

3.2.1 Strap hangers: install in accordance with SMACNA.

3.2.2 Angle hangers: complete with locking nuts and washers.

3.2.3 Hanger Spacing as follows:

Duct Size		Spacing	
mm	(IN)	mm	(IN)
To 1500	(60")	3000	(10 ft.)
1500	(61") and over	2500	(8 ft.-6 in.)

3.3 **Leakage Test**

3.3.1 Make trial leak test, as instructed on site to demonstrate workmanship.

3.3.2 Install no additional ductwork until trial test has been passed.

3.3.3 Test section minimum of 30m (100 ft.) long with not less than (3) branch takeoffs and (2) 90^{o} elbows.

3.3.4 Conduct test in accordance with Associated Air Balance Council. (AABC).

3.4 **Sealing**

3.4.1 Apply sealant to outside of joints to manufacturer's recommendations.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Conform to sections of Division 1 as applicable.

1.1.2 Section 23 00 00 shall apply to and govern the work of this section.

1.1.3 Provide labour, materials, products, equipment and service to complete the Duct Accessories Work.

2. **PRODUCTS**

2.1 **Flexible Connections**

2.1.1 Frame shall be galvanized sheet metal, 1mm thick, (20ga), with fabric clenched by means of double locked seams.

2.1.2 Material shall be neoprene, self-extinguishing, glass fabric coated. Temperature rate -40°C to plus 90°C (-40°F to plus 194°F), density of 1.3 kg/m^2 (0.26 lb/ft^2)

2.1.3 Standard of Acceptance:

2.1.3.1 Duro-Dyne Canada Ltd. – Durolon

2.1.3.2 Dentfabric Inc. – Ventglas

2.1.3.3 Elgen Manufacturing Corp. - Neoprene

2.1.4 Connections for kitchen exhaust and fume hood exhaust systems shall be fabricated from heavy reinforced durable cloth.

2.1.5 Standard of Acceptance:

2.1.5.1 Duro-Dyne Canada Ltd.

2.1.5.2 Elgen Manufacturing Corp.

2.2 **Sealant And Tape**

2.2.1 Sealant shall be resistant polymer type flame resistant high velocity duct sealing compound. Temperature range of -30°C to plus 93°C (-22°F to plus 200°F).

2.2.2 Standard of Acceptance:

2.2.2.1 Foster 30-02

2.2.2.2 Duro-Dyne S-2

2.2.2.3 3M Company EC-800

2.2.3 Tape shall be polyvinyl treated open weave fibre glass tape, 50mm (2 in.) wide.

2.2.4 Standard of Acceptance:

2.2.4.1 Duro-Dyne FT-2

2.3 **Access Doors**

2.3.1 Non-insulated sandwich construction shall be of same material as duct, one sheet metal thickness heavier, minimum 0.6mm (26ga.) thick complete with sheet metal angle frame.

2.3.2 Insulated sandwich construction shall be of same material as duct, one sheet metal thickness heavier, minimum 0.6mm (26ga) thick complete with sheet metal angle frame and 25mm (1 in.) thick rigid fibre insulation.

2.3.3 Gasket shall be neoprene or foam rubber.

2.3.4 Hardware:

2.3.4.1 Up to 300mm x 300mm (12 in.x12 in.): 2 sash locks.

2.3.4.2 301mm x 450mm (13 in. x18 in.): 4 sash locks.

2.3.4.3 451mm x 1000mm (19 in.x40 in.): piano hinge and minimum 2 sash locks.

2.3.4.4 Doors over 1000mm (40 in.) piano hinge and 2 handles operable from both sides.

2.3.4.5 Access doors in uninsulated plenums and high velocity ducts shall be galvanized sheet metal with door frames welded in place.

2.3.4.6 Access doors in uninsulated low and medium pressure ducts shall be fabricated from 0.8mm (22ga.) galvanized sheet with riveted strap angle frames.

2.3.4.7 In insulated plenums and ductwork access doors shall be 0.8mm (22ga.) for low and medium pressure ductwork and 1.2mm (18ga.) for plenums and high pressure ductwork and shall be constructed with an insulated liner, not less

than 25mm (1 in.) thick, and shall be double wall construction.

2.3.4.8 Access doors shall be fitted with neoprene gaskets.

2.3.4.9 Doors in ductwork shall be secured with sash type fasteners.

2.3.4.10 Doors in plenums shall be hinged and provided with two, two lever handle catches, for operation from both inside and outside of plenums.

2.3.4.11 Standard of Acceptance: Duro-Dyne SP-20

2.3.4.12 Where prefabricated duct access doors are proposed, submit shop drawings for approval.

2.4 **Turning Test Ports**

2.4.1 Factory or shop fabricated single or double thickness to recommendations of SMACNA.

2.5 **Instrument Test Ports**

2.5.1 1.6mm (16ga.) thick steel zinc plated as per manufacturer's recommendations.

2.5.2 Cam lock handles with neoprene expansion plug and handle chain.

2.5.3 28mm (1-3/32 in.) minimum inside diameter. Length to suit insulation thickness.

2.5.4 Neoprene mounting gasket.

2.5.5 Standard of Acceptance: Duro-Dyne IP1 or IP2

3. **EXECUTION**

3.1 **Flexible Connections**

3.1.1 Provide flexible connections between air handling equipment and ductwork as shown.

3.1.2 Securely anchor ductwork to building structure at the flexible connection and select length of flexible material to allow 100mm (4 in.) movement of supply air equipment and 50mm (2 in.) for other fans.

3.2 **Sealant And Tapes**

3.2.1 Apply sealant in accordance with SMACNA and to manufacturer's recommendations.

3.2.2 Bed tape in sealant and recoat with minimum one coat of sealant to manufacturer's recommendations.

3.3 **Access Doors**

3.3.1 Install access doors in ducts, casings and plenums as shown and as specified herein.

3.3.2 Access doors in ducts shall be maximum size possible with duct sizes up to and including 356mm (14 in.). With duct sizes 380mm (15 in.) and larger, access doors shall be 305mm x 380mm (12 in.x15 in.).

3.3.3 Access doors in casings and plenum shall be 1524mm (60 in.) high by 457mm (18 in.) wide or larger where required for removal of motors or other equipment located within plenum or casing.

3.3.4 Install access doors in ductwork before and after reheat coils, terminal coils and air monitoring devices, and at fire dampers, duct smoke detectors firestats and other control elements, or as otherwise indicated.

3.4 **Instrument Test Ports**

3.4.1 For traverse readings, install in accordance with recommendations of SMACNA.

3.4.2 For temperature readings, install in accordance with recommendations of SMACNA.

3.4.3 Locations of Transverse:

.1 At ducted inlets to roof and wall exhausters.

.2 At inlets and outlets of other fan systems.

.3 At main and sub-main ducts.

.4 And as indicated.

3.4.4 Temperature:

.1 At outside air intakes.

.2 At mixed air locations.

.3 At inlet and outlet of coils.

.4 Downstream of junctions of two converging air streams of different temperatures.

.5 And as indicated.

3.5 **Turning Vanes**

3.5.1 Install in accordance with recommendations of SMACNA.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Conform to section of Division 1 as applicable.

1.1.2 Section 23 00 00 shall apply to and govern the work of this section.

1.1.3 Provide labour, materials, products, equipment and service to complete the Acoustic Lining of Ductwork and Plenums Work.

2. **PRODUCTS**

2.1 **General**

2.1.1 Fibrous glass duct liner density 22 kg/m^3 (1.4 lb/ft^3): one side coated with black neoprene.

2.1.2 Flame spread rating shall not exceed 25. Smoke development rating shall not exceed 50.

2.2 **Rigid Lining**

2.2.1 25 mm (1 in.) thick for rectangular ductwork, and 50 mm (2 in.) thick for plenums and casings, to CGSB 51-GP-10M fibrous glass rigid board duct liner.

2.2.2 Rigid lining to be used on all flat surfaces.

2.3 **Flexible Lining**

2.3.1 25mm (1 in.) thick to CGSB-51-GP-11M.

2.3.2 Flexible lining to be used on all round and oval surfaces.

2.4 **Standard Of Acceptance**

2.4.1 Fiberglas Canada Inc.

2.4.2 Manson Insulation Inc.

2.5 **Adhesive**

2.5.1 Flame spread rating shall not exceed 25. Smoke development rating shall not exceed 50. Temperature range -29°C to plus 93°C (4°F to plus 200°F). Meet requirements of NFPA 90A-1985.

2.5.2 Standard of Acceptance:

2.5.2.1 DuroDyne 1A-22

2.5.2.2 Foster - S.M. Adhesives

2.5.2.3 Goodloe & Moore - Tuff Bond

2.6 **Fasteners**

2.6.1 Weld pins 2.0mm (1/16 in.) diameter, length to suit thickness of insulation.

2.6.2 Nylon or metal retaining clips 32mm (1 1/4 in.) square.

2.6.3 Standard of Acceptance:

2.6.3.1 DuroDyne PN series with NC series clips

2.6.3.2 Goodloe & Moore – Gemco

2.7 **Joint Tape**

2.7.1 Polyvinyl treated open weave fibreglass membrane 50mm (2 in.) wide.

2.7.2 Standard of Acceptance:

2.7.2.1 Duro Dyne FT - 2

2.8 **Sealer**

2.8.1 Flame spread rating shall not exceed 25. Smoke development rating shall not exceed 50. Temperature range -68°C to plus 93°C (-4°F to plus 200°F) meet requirements of NFPA 90-1985.

2.8.2 Standard of Acceptance:

2.8.2.1 Duro Dyne S-2

2.9 **Metal Liner**

2.9.1 Use on plenums and casings: 1.6 mm (16ga) 20mm x 10mm (3/4 in. x 3/8 in.) flattened expanded metal lath, where indicated on drawings.

3. EXECUTION

3.1 General

3.1.1 Provide acoustic lining of ductwork and plenums as specified. Size remaining inside insulation shall be duct size called for.

3.1.2 Install lining in accordance with manufacturer's recommendations and in accordance with recommendations of SMACNA.

3.1.3 Apply 1 mil Mylar film on acoustic lining in plenums and ductwork. Flame Spread rating of the Mylar film shall not exceed 25 and smoke development rating shall not exceed 50.

3.2 Duct Liner

3.2.1 Acoustic lining in rectangular ductwork shall be 25mm (1 in.) thick rigid duct liner, fastened to the interior of duct with metal clips and washers spaced at not more than 300mm (12 in.) centers.

3.2.2 Acoustic lining in round ductwork shall be 25mm (1 in.) flexible duct liner with fastenings as specified for rectangular ductwork.

3.2.3 Plenums and Casings shall be lined with 50mm (2 in.) rigid insulation fastened as for ductwork with additional 500mm (2 in.) edge crimped 1mm (20ga) galvanized corner angles and flattened expanded metal lath secured over the loner and under edge nosing.

3.2.4 Apply perforated metal liner on acoustic insulation in high pressure/high velocity ductwork.

3.3 Joints

3.3.1 Seal all joints, exposed edges, weld pins and clip penetrations and all damaged areas of liner with joint tape. Badly damaged areas of lining to be replaced at discretion of Architect/Engineer.

3.3.2 Install joint tape in accordance with manufacturer's recommendations, recommendations of SMACNA and as follows:

3.3.2.1 Bed tape in sealer

3.3.2.2 Apply 2 coats of sealer over tape

3.3.3 Protect leading and trailing edges with sheet metal edging.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Conform to Sections of Division 1 as applicable.

1.1.2 Sections 23 00 00 shall apply to and govern the work of this Section.

1.1.3 Provide labour, materials, products, equipment and service to complete the Diffusers, Grilles and Registers work.

2. **PRODUCTS**

2.1 **General**

2.1.1 Provide diffusers, registers and grilles as shown.

2.1.2 Diffusers, register and grille schedule on the Drawings identifies the type designation used on the floor plans with model numbers taken from the listed manufacturers catalogue.

2.1.3 Provide linear diffusers with end caps, mitered corners and alignment key strips for multiple section, as applicable.

2.1.4 Round, square and rectangular diffusers shall be provided with equalizing deflector if the collar neck exceeds 200mm (8 in.) in length, and extract volume control dampers except at last diffuser on branch.

2.1.5 Provide butterfly dampers for light or ceiling air supply boots where flexible duct connector is taken from branch supply duct.

2.1.6 Diffusers, registers and grilles in accordance with schedule shall be manufactured by:

.1 E.H. Price Limited,

.2 Carnes (Airex),

.3 TITUS.

2.1.7 Refer to the Grilles and Registers Schedule for type and model.

2.1.8 Finish: as indicated on the schedule.

3. **EXECUTION**

3.1 **Installation**

3.1.1 Install in accordance with manufacturer's instructions.

3.1.2 Install with flat head screws in counter-suck holes where fastenings are visible.

3.1.3 Install supply registers with face bars horizontal.

3.1.4 Install linear diffusers with end caps, mitered corners and alignment key strips for multiple sections.

3.1.5 Install light or ceiling air supply boots with butterfly volume dampers where flexible duct connector is taken from branch supply duct.

3.1.6 Drawings showing position of outlets are essentially diagrammatic. Coordinate exact locations with other elements as shown on reflected ceiling drawings and select trim to suit ceiling materials listed in Finish Schedules.

END OF SECTION

1. **GENERAL**

The automatic temperature controls (ATC) under this section will be supplied and installed in accordance with the General Conditions, and Referenced Documents.

1.2 The installation of the ATC shall be in accordance with all National, State and Local codes pertaining to this type of work.

1.3 The scope shall include furnishing and installing a temperature control system to include remote control panels, temperature control devices, appurtenances, etc. to accomplish specific control sequences specified herein, to provide overheating and freeze protection for HVAC units, sensing and indicating devices, temperature indicating instruments, supporting structures and other required components.

1.4 The scope shall include all thermostats, sensors, dampers, actuators, microprocessor central controllers, VVT boxes, static pressure sensors, and all other new components of the system requiring connections.

2. **PRODUCTS**

2.1 **Submittals**

2.1.1 The following data/information shall be submitted for approval:

2.1.2 Complete sequence of operation.

2.1.3 Control system drawings including all pertinent data, to provide a functional operating system.

2.1.4 Damper schedules showing size, configuration, capacity and location of all equipment.

2.1.5 Data sheets for all hardware control components

2.1.6 A description of the installation materials including conduit, wire, flex, etc.

2.1.7 Thermostat/Sensor locations

2.1.8 Control panel locations

2.1.9 Provide as part of the submittal three copies of all data and control drawings.

2.2 **System Description**

2.2.1 The SYSTEM shall be a commercial modulating Auto Changeover zoning system with modulating Bypass that controls a single HVAC unit and supports 2 - 17 modulating zones. The control panel shall be Universal and supporting Gas/Electric or Heat Pump applications with two cooling stages and three stages of Heat.

2.2.2 Zone dampers shall be fully modulating with elliptical dampers. The system shall poll each thermostat every 60 seconds to evaluate the number of heating and cooling calls in the System. Control decisions shall be Vote based. A priority selection device shall be available to weight or add priority to one or more zones from the system controller. System shall also provide an Opposed Call feature to address maverick zones in the system.

2.2.3 System controller shall digitally display Leaving Air Temperatures at all times from the unit and provide for an adjustable setting for cooling and heating cut out set points. Occupied and unoccupied setup and setback capability shall also be available with 2-hour override capability. A thermostat locking function shall be available from the system controller with minimum local control at each thermostat in the system.

2.2.4 The System shall provide full control of HVAC heating and cooling equipment in multiple zone applications.

2.3. **Control Manufacturer**

2.3.1 The control system will be the SYSTEM 2000 *GEN II* Zoning System, as manufactured by Zonex Systems, Huntington Beach, CA. Other approved Manufacturers are acceptable. Contractor shall verify compatibility with Landlords roof top A/C unit.

2.4. **Stand Alone System Controller**

2.4.1 Each zoned HVAC unit shall contain a stand alone microprocessor controller capable of supporting up to 17 modulating zones (Model *GEN II*).

2.4.2 The system controller shall be universal and equipped to handle Gas / Electric or Heat Pump units and will communicate and power all zones with one twisted pair data link and 24-volt AC power daisy chained from thermostat to thermostat.

2.4.3 The system controller will be automatic changeover logic. The system utilizes first call priority and majority rule operation. System must address or have the ability to address opposing calls. When a call is made to the system, the HVAC system will be turned on to the proper mode. During the operation of the HVAC unit the system controller will poll all zones every 60 seconds to determine that the majority of zones are being satisfied and not wanting the opposite mode.

2.4.4 If the majority of the zones want the opposite mode during the polling, the changeover to the opposite mode will start after a maximum of five minutes in the existing mode to attempt to satisfy all calls in this mode. After five minutes, the existing mode equipment is terminated with the blower continuing to purge the system for 240 seconds. After the purge cycle is completed, the dampers will take 90 seconds to reposition themselves for the opposite mode. After the dampers reposition themselves, the opposite mode equipment is energized. If the system has satisfied all calls, all dampers shall modulate to the 50 per cent position for ventilation.

2.4.5 The system controller will communicate to the zone thermostats the mode the system is in, and the zone thermostats will notify the damper of which position to meet that zone's needs.

2.4.6 The system controller shall have a selectable fan option for continuous or intermittent operation.

2.4.7 The system controller will have the capability to lock all thermostats from the controller.

2.4.8 The system controller shall provide occupied and unoccupied or day/night operation with the addition of a system time clock.

2.4.9 The system controller shall be equipped with an onboard diagnostic routine to ensure the installing contractor his control wiring and communication wiring are operational.

2.4.10 The system controller shall provide the air balance contractor with the ability to open all zone dampers and energize the fan from the system controller.

2.4.11 The system controller shall allow the contractor to provide default occupied and unoccupied set points for every thermostat or sensor in the system directly at the controller.

2.4.12 The system controller shall provide the ability to establish 1 or 2 additional votes on one or all thermostats in the system, establishing priority votes directly at the system controller.

2.4.13 The system controller shall include an onboard capacity controller and algorithm to protect the HVAC equipment.

2.5. **Capacity Controller (HVAC Equipment Protection)**

2.5.1 The capacity control receives the heating or cooling signal from the system controller and regulates the equipment (on and off) to meet the building requirements.

2.5.2 The *GEN II* controller shall be equipped with a Leaving Air Temperature sensor constantly monitoring and displaying discharge temperature on the *GEN II* controller.

2.5.3 The capacity control shall have the capability to shut down stages based on a rise or fall in leaving air temperature above or below a fully adjustable range of temperature. The system shall provide protection from short cycling and protect the unit from coil freeze up or overheating the heat exchanger.

2.5.4 Capacity control shall also provide second stage heating or cooling operation based on a fully adjustable timer with a range of 3 – 30 minutes in increments of 1 minute. Second stage operation shall be initiated based on time and leaving air temperature or via a selectable jumper, time and room temperature.

2.6. **Zone Temperature Sensors**

2.6.1 The Capacity control receives heating or cooling signal from the system controller and regulates the equipment (on and off) to meet the building requirements

2.6.2 The GEN II controller shall be equipped with a Leaving Air Temperature sensor constantly monitoring and displaying discharge temperature on the GEN II controller.

2.6.3 The capacity control shall have the capability to shut down stages based on a rise or fall in leaving air temperature above or below a fully adjustable range of temperature. The system shall provide protection from short cycling and protect the unit from coil freeze up or overheating the heat exchanger.

2.6.4 Capacity control shall also provide second stage heating or cooling operation based on a fully adjustable timer with a range of 3-30 minutes in increments of 1 minute. Second stage operation shall be initiated based on the time and leaving air temperature or via a selectable jumper, time and room temperature.

2.7. **Bypass dampers and Controls**

2.7.1 The modulating bypass damper(s) are to be installed as shown on accompanying drawings. When utilizing a ceiling return, there must be a short return plenum with the bypass directly connected to the supply and return plenum.

2.7.2 When the HVAC unit utilizes an economizer section, the return air inlet to the return air plenum must contain counter balanced dampers to prevent air pressurization of the return air system.

2.7.3 Each round bypass damper (Model STBP) shall consist of 20-22 gauge galvanized metal duct fitted with an elliptical damper to provide linear airflow. The damper shall contain a foam seal to prevent leakage when fully closed. Each damper will contain a full stall 24-volt modulating actuator, which shall not draw more than 2 VA on one drive assembly. The damper shell will be crimped on one end and beaded on both ends for damper rigidity.

2.7.4 Each rectangular bypass damper (Model STCDBP) shall be constructed of a 20-gauge “snap-lock” steel frame with S & Drive connections. The total length of the damper will be 406mm (16”). Dampers 254mm (10”) and smaller in height will utilize single blade construction; dampers larger than 254mm (10”) in height will utilize opposed blade construction. The damper blades are of formed steel design with gasketed stops to provide quiet operation and structural integrity.

2.7.5 The bypass damper shall be controlled by an electronic integrated static pressure control. This bypass sensor shall be located downstream of the bypass connection from the supply plenum and upstream from the first zone damper. This device continually senses the discharge air static pressure and signals the bypass damper to modulate open or close.

2.7.6 Bypass may be slaved with additional dampers, if required, to provide additional bypass; or consider utilizing one larger rectangular bypass.

2.7.8 The transformer powering the bypass damper shall only be energized when the HVAC indoor blower is operating.

2.8. **Zone Dampers**

2.8.1 Each round zone damper (Model STMPD) shall consist of 20-22 gauge galvanized metal duct fitted with an elliptical damper to provide linear airflow. The damper shall contain a foam seal to prevent leakage when fully closed. Each damper will contain a full stall 24-volt modulating actuator, which shall not draw more than 2 VA on one drive assembly. The damper shell will be crimped on one end and beaded on

both ends for damper rigidity. Dampers shall be equipped with min/max position stops and indicators.

2.8.2 Each rectangular zone damper (Model STCD) shall be constructed of a 20-gauge "snap-lock" steel frame with S & Drive connections. The total length of the damper will be 406mm (16"). Dampers 254mm (10") and smaller in height will utilize single blade construction; those dampers larger than 254mm (10") in height will utilize opposed blade construction. The damper blades are of formed steel design with gasketed stops to provide quiet operation and structural integrity. Dampers shall be equipped with min/max position stops and indicators.

2.8.3 Zone dampers shall be fully modulating in operation based on input received from each zone thermostat. Modulation shall be predicated on variance from set point. If the system has satisfied all calls, all dampers shall modulate to the 50% position for ventilation.

2.8.4 All zone dampers shall be connected to its zone thermostat by 3-wire, 18-gauge copper wiring. The zone thermostat shall continuously monitor room temperature and modulate damper position based on variance from its set point to provide effective temperature control as required.

2.9. **Transformers and Wiring**

2.9.1 An independent 24-volt transformer sized at 2 VA per zone damper or D-Fuser shall power the *GEN II* System Controller and all dampers in the system.

2.9.2 The bypass dampers shall be served by a 40 VA / 24-volt transformer. The load side of the blower motor starter shall power this transformer.

2.9.3 All power wiring of this system shall be 24-volt AC.

3. **EXECUTION -** NOT APPLICABLE

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Conform to Sections of Division 1 as applicable.

1.1.2 Section 260000 shall apply to and govern the work of all Sections of Division 26.

1.1.3 Division 26 of the Specification is an integral part of the Contract Documents and shall be read accordingly.

1.2 **Codes and Standards**

1.2.1 Complete installation in accordance with the requirements of the Ontario Electrical Safety Code. (Latest Bulletins)

1.2.2 Comply with CSA Certification Standards and Electrical Bulletins in force at time of tender submission.

1.2.3 Comply with the Ontario Building Code.

1.2.4 Abbreviations for electrical terms: to CSA Z85-1983**.**

1.3 **Discrepancies**

1.3.1 The drawings and specifications are complementary and reference a complete installation.

1.3.2 Notify Engineer of any discrepancies, omissions, etc. prior to the signing of the Contract, otherwise the Contractor shall perform the work as directed at no additional cost to the owner.

1.4 **Scope of Work**

1.4.1 Provision of labour, materials, tools, transportation, services and facilities for the complete electrical installation as specified and as shown on the drawings. The installation shall be left complete in all respects and ready for operation. Final acceptance shall be given by the Engineer.

1.4.2 The scope of work includes installation of complete and operational electrical system, but is not necessarily limited to following provisions indicated in this scope of work. Following scope of work should be read as general outline of required electrical work.

1.4.3 New Tenant electrical service from existing landlord’s electrical room. Work to be coordinated with landlords representative.

1.4.4 Complete grounding system installation as per O.E.S.C. requirements.

1.4.5 Installation of 200A 208/120V 3PH tenant’s electrical service. Including distribution panels, circuit breakers and one TVSS device

1.4.6 Connections to Landlord’s electrical equipment as indicated on drawings.

1.4.7 Interior lighting system installation as per electrical drawings.

1.4.8 Emergency lighting and exit sign system installation.

1.4.9 Electrical systems - complete branch circuit wiring and connections.

1.4.10 Electrical distribution and connection to mechanical systems.

1.4.11 Data / communication system empty conduit installation.

1.4.12 New telephone system from Landlord’s point of connection.

1.4.13 All related testing and commissioning for new electrical systems. Call for assistance signal system as per electrical drawings. Fire alarm system as per electrical drawings.

1.5 **Definitions**

1.5.1 Wherever the words "indicated", "shown", "listed", or similar words or phrases are used in the Specification they shall be understood, unless the context otherwise provides, to mean that material or item referred to is "indicated", "shown", "listed", or "noted" on the Drawings.

1.5.2 The term "provide" where used shall be understood to include labour, materials and services necessary to supply and install the item or work referred to.

1.6 **Documents**

1.6.1 Examine all drawings, specifications, schedules (including those of other sections), Instructions to Bidders, General Conditions of the Contract, Supplementary Conditions and Special Requirements for information affecting this section.

1.6.2 Refer to Specification and Drawing Index to ensure that sets are complete at time of tender and during construction period. Report any discrepancies to Consultant prior to tender closing. No adjustments will be allowed to contract price due to non-conformance with the above.

1.7 **Examination**

1.7.1 Examine work done under other sections. Notify Consultant in writing of discrepancies that would affect this section. Refer to Section 010000 General Instructions for information and instructions applicable to Division 26.

1.7.2 Visit site prior to submission of tender to determine existing conditions affecting the work under this Contract, and requirements for protection of adjacent work and accept site and existing work as it exists at time of commencement of work. Verify all dimensions at the site.

1.8 **Drawings**

1.8.1 Carefully examine all drawings and specifications relating to the work to be certain that the work under this Contract can be satisfactorily carried out and prior to submission of tender, examine the work of the other trades and report at once to the Engineer, any defect, discrepancy, omission or interference affecting the work of this section or the guarantee of same.

1.8.2 Refer to Mechanical and Architectural plans and specifications for electrical work in conjunction therewith where such work is included in these sections of the specifications.

1.8.3 The drawings accompanying these specifications are intended to show the general arrangement and extent of the work to be done, but the exact location and arrangement of all parts shall be determined as the work progresses. The location of outlets, equipment, etc. as given on the drawings are approximately correct but it shall be understood that they are subject to such modifications as may be found necessary or desirable at the time of installation to meet any structural, mechanical or architectural conditions. Such changes may be made by the Electrical Sub-Contractor, as directed by the Consultant without additional charge.

1.8.4 Drawings indicate the general location and route to be followed by the conduits and ducts that are to be installed under the contracts, but these locations must be governed by job conditions. Where the required conduits, ducts and boxes are not shown on the drawings, or only shown diagrammatically, they shall be installed in such a way as to conserve maximum head room and interface as little as possible with the free use of the space through which they pass.

1.8.5 Submit a complete set of drawings for the proposed installation and receive written approval from the inspection department having jurisdiction before fabrication and/or installation of any equipment.

1.8.6 Do not scale electrical drawings. Refer to architectural drawings for dimensions, levels, door locations, door swings and other architectural details.

1.8.7 Drawings, detail sheets and specifications shall all apply to the work and shall not be used separately.

1.8.8 Submit detailed dimensional shop drawings of all items of electrical equipment to the Consultant for approval, in accordance with the requirements of the General Conditions.

1.8.9 As work progresses, record on one set of drawings any changes to conduit layout as well as any approved changes and deviations from the contract and/or working drawings, including outlet, equipment or panel location, etc., and at completion of work, submit to the Engineer.

1.8.10 As-Built drawings shall show locations of distribution and sub-distribution feeders.

1.9 **Approval of Materials and Equipment**

1.9.1 Electrical equipment shall be new and CSA approved.

1.9.2 Electrical equipment shall be manufactured in accordance with the current CEMA, NEMA, EEMAC, ULC and CSA standards.

1.9.3 Materials and equipment of the same classification, type or function, shall be provided by the same manufacturer.

1.9.4 Any materials or equipment ordered or installed without the Consultant's prior approval shall, if so directed by the Consultant, be removed and replaced with approved material or equipment at the Contractor's expense.

1.10 **Shop Drawing Submissions Requirements**

1.10.1 Submit sufficient quantity (minimum of 6) copies of shop drawings to the Engineer for approval, prior to any ordering, manufacturing and installation of equipment in architect's office (if applicable). Sufficient quantity shall be defined at the first Job Site Meeting and include sufficient for Engineer's office, Maintenance Manuals and Contractor's use.

1.10.2 Drawings shall reference manufacturers name, catalogue model number, voltage, phase, frequency, full load amps, wiring diagrams, dB sound level, mounting arrangements, etc. Data which would normally be required to properly reference the product and ensure at the shop drawing review stage, that the product is suitable for the application.

1.10.3 Shop drawings shall be checked before submission to the Consultant.

1.10.4 Electrical equipment shall not be ordered or manufactured until shop drawings have been reviewed by the Consultant.

1.10.5 Shop drawings of all equipment must be submitted in sufficient time.

1.10.6 Distribution shop drawings shall list interrupting ratings of all circuit breakers that are to be supplied.

1.10.7 Submit photocopies of shop drawings only to facilitate communicating review status comments.

1.10.8 Submit photocopy of shop drawings for panel boards and other special items of electrical equipment to the Consultant for approval.

1.10.9 Shop drawing submissions, as a minimum, shall encompass the following:

.1 Electrical distribution panels.
.2 Branch circuit electrical panels and breakers.
.3 Controls and push buttons.
.4 Lighting Fixtures and lamps.
.5 Exit Lights.
.6 Emergency battery unit’s c/w heads.
.7 Electric heaters and controls.
.8 Dry Type Transformers.

1.11 **Quality Assurance**

1.11.1 **Regulatory Requirements**

1.11.1.1 Materials and workmanship shall be in accordance with requirements and recommendations of applicable rules, regulations, standards and codes as specified hereunder. All products shall bear certification label of CSA, ULC, Ontario Hydro as applicable:

.1 Canadian Standards Association (CSA)
.2 Underwriter's Laboratories of Canada (ULC)
.3 Electrical and Electronic Manufacturers Association of Canada (EEMAC)
.4 Ontario Building Code (OBC) – latest edition
.5 Ontario Fire Code (OFC)

.6 Ministry of Labour

.7 Municipal Boards having jurisdiction

.8 Ministry of the Environment

1.11.1.2 In no instance shall the standard established by the drawings and specifications be reduced by applying any of the Codes referred to herein.

1.11.2 **Permits, Fees and Certificates**

1.11.2.1 Give notice, obtain all necessary permits, pay fees and furnish certificates as evidence that the work installed conforms with the laws and regulations of all governing authorities, before the final certificate of payment is issued.

1.11.2.2 Arrange for inspection of all work, by the authorities having jurisdiction over the work. On completion of the work, present to the Owner the final unconditional certificate of approval of the inspecting authorities.

1.11.2.3 Before starting any work, submit the required number of copies of drawings and specifications to the authorities for their approval and comments. Comply with any changes requested as part of the contract, and notify the Engineer immediately of such changes, for proper processing of these requirements. Prepare and furnish any additional drawings, details or information as may be required.

1.11.2.4 Obtain a Certificate of Inspection and Approval from the Electrical Safety Authority on completion of the electrical work. Submit Certificate of Inspection and Approval to the Consultants before the final inspection of the electrical work.

1.11.2.5 Include copies of Certificate of Inspection and Approval in the Maintenance Manuals.

1.12 **Supervision**

1.12.1 Supervise the electrical work at all times through a responsible and competent supervisor.

1.12.2 Employ the same superintendent and workmen as far as possible throughout the duration of the electrical work.

1.12.3 Employ only experienced and competent journeymen and apprentices on this project.

1.13 **Co-operation With Other Trades**

1.13.1 Refer to mechanical drawings for construction details, and co-ordinate electrical work with the work of other trades.

1.13.2 Refer to architectural drawings to confirm door swings on electrical drawings are correct before installing wall switches. Install wall switch on strike side of the door.

1.13.3 Pay all costs for the relocation of electrical equipment where the installation of the electrical equipment has not been properly co-ordinated with other trades and must be relocated.

1.13.4 Supply and install additional supports and wiring for lighting fixtures and other electrical equipment as required where structural members, air ducts, piping or other equipment conflicts with the electrical installation.

1.14 **Protection**

1.14.1 Refer to General Conditions of the Contract.

1.14.2 Cover openings in equipment and materials. Cover temporary openings in ducts and conduit with polyethylene sheets, until final connection is made.

1.14.3 Protect all existing equipment to be re-used.

1.15 **Cleaning, Painting and Finishing**

1.15.1 Shop finish metal enclosure surfaces by removal of rust and scale, cleaning,

application of rust resistant primer inside and outside, and at least two coats of finish enamel.

1.15.2 Protect electrical equipment from damage by the work of other trades.

1.15.3 Supply all exposed ferrous metal work, except conduit, with at least one factory prime coat, or paint one prime coat on job. Clean up or wire brush all equipment before painting.

1.15.4 Clean, wire brush and paint ferrous supports and hangers if not factory coated where concealed in spaces of kitchen or similar possibly high humidity areas. Use epoxy red oxide primer as mobile paint code No.0-611-115, or approved alternative.

1.15.5 Touch up minor damage to electrical equipment with standard factory applied baked enamel finish. Items suffering major damage to finish, if too extensive to be remedied by touch up in Engineer's opinion, shall be entirely replaced.

1.15.6 Before the Certificate of Substantial Performance will be issued by the Owner, all luminaries, lamps, panel boards, switches, receptacles, cover plates and other electrical equipment shall be clear and free of dust, plaster, paint, etc. Any equipment that is scratched or damaged shall be refinished or replaced as designated by the Engineer.

1.16 Cutting, Patching, "Fire Stopping" And Touch-up Paint

1.16.1 The cutting, patching and repairing of existing wall openings made for electrical equipment through the walls, floors and ceilings shall unless stated otherwise be done by the Division 26 Tradesmen.

1.16.2 For new electrical work, where rated and finished walls are to be pierced, the openings required by the Division 16 any openings that are required in the vicinity to accommodate the work of other trades, and where possible, conduits shall be extended through common openings. The cutting of these openings will be done by skilled tradesmen and the patching and "Fire stopping" of these openings done as outlined below.

1.16.3 Fire rated walls are shown on the Architectural Drawings.

1.16.4 For piercing fire rated walls (e.g. Electrical Rooms) use a seal or firestop with an equal or higher fire rating through the wall or floor to be sealed. All seals and fire stopping must be a ULC approved material or assembly. ULC Approved Fire Stop Material:

.1 Meet CGSB 19-GP-9M Standard

.2 3M Brand Fire Barrier FS-195 Wrap/Strip, 7904 Series system or CS-195 Composite sheet with CP 25S/L elastomer or mouldable putty.

.3 A/D Fire barrier RTV Foam or A/D Silicone Fire barrier Sealant SL over A/D Fire barrier Mineral Wool Fire stopping.

.4 Dow Corning 3-6548 Silicone RTV Foam or Dow Corning Fire Stop Intumescent Wrap Strip over damming material.

.5 Tremco Fyre-Shield or Fyre-Sil as per ULC systems testing.

.6 Allow for in bid price radar screening of existing walls/floors for any concealed existing services or structural members before any cutting and core drilling.

1.17 Inserts, Sleeves, Escutcheons And Curbs

1.17.1 Use only factory made, threaded or toggle type inserts as required for supports and anchors, properly sized for the load to be carried. Place inserts only in portions of the main structure and not in any finishing material.

1.17.2 Use factory made expansion shields where inserts cannot be placed but only where approved by the architect and for lightweights.

1.17.3 Supply and locate all inserts, holes, anchor bolts and sleeves in time when walls, floors and roof are erected.

1.17.4 Where conduits pass through existing roof structure, extend it through water seal sleeves. Size sleeves to provide 13mm clearance all around.

1.17.5 Sleeves are not required in fire rated walls and floors, where conduit is to be

routed through it.

1.17.6 Pack all sleeves between the conduit and the sleeve with loose fibreglass insulation.

1.18 **Fasteners, Supports & Protection**

1.18.1 Provide adequate fastenings and supports for all electrical equipment, conduits, etc. as specified in Division 26, using approved fastenings and supports.

1.18.2 Do not use wire lashing or perforated strap to support or secure raceways or equipment.

1.18.3 Provide adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

1.18.4 Do not use supports or equipment installed for other trades for conduit support except with permission of the other trade and the approval of the Engineer.

1.18.5 Protect exposed live equipment such as panel mains and outlet wiring during construction for personnel safety.

1.18.6 Provide all supports required for the proper erection and support of the electrical work. Construct supports of steel and creosoted wood roof supports. Steel supports shall be galvanized before fabrication.

1.18.7 Contractor shall provide concrete bases where shown or specified for floor mounted equipment. Concrete bases shall be 100 mm high extending at least 150 mm around equipment, complete with chamfered edges.

1.18.8 Incorporate all requirements for anchor bolts and of the vibration mountings as required between equipment and base.

1.18.9 Provide min. 19 mm plywood backboards for mounting of electrical and telephone equipment. Backboards shall be painted with fire retardant paint - medium grey.

1.18.10 All suspended equipment shall be supported from bottom. Support equipment with inherent beam strength from cast to welded steel saddles having proper curvature. All necessary angle iron between structural steel beams or joists shall be supplied and installed by the electrical contractor.

1.18.11 Pipe supports and hangers shall be approved type, properly located and installed to give adequate support without excessive sway or vibration, and to provide freedom of movement for thermal expansion. Support horizontal piping at intervals in accordance with the requirements of applicable Codes and Regulations or as specified under the applicable electrical Section. Hangers, unless otherwise specified, shall be adjustable wrought steel clevis type with supporting nut and upper lock nut.

1.18.12 Trapeze type hangers may be used where conduits are grouped together, consisting of a substantial horizontal steel angle or channel provided with adjustable steel rods, fitted approved beam clamps or rod with supporter nut and a second locknut. "Cantruss" system is an approved support system.

1.18.13 Install all conduit securely supported from hangers or supports, in a manner to ensure that building construction is not weakened or over-stressed; that pipes are secure, vibration free, free to expand and contract and properly graded; and that vertical adjustment of horizontal pipes is possible after erection. Do not suspend conduits, or equipment from other pipes, ducts, metal deck or ceiling. Follow instructions given on structural drawings for proper pipe support and provide all materials to meet requirements.

1.18.14 Support light fixtures from the structure. Recessed fluorescent fixtures in tile-ceiling to be independently supported from the T-Bars. All support brackets for lighting fixtures are supplied and installed by the Contractor to satisfy the intent of the Architect/Engineer. Brackets required to support light fixtures are to be supplied and installed by this Contractor.

1.18.15 Supports and conduits shall be hung from inserts in the concrete slab, from steel beams or from the lower cord of open web steel joists (O.W.S.J.) near panel-points. Maximum point-loads of O.W.S.J. supports must be approved by the Structural Engineer.

1.19 **Identification And Nameplates**

1.19.1 Panels, telephone cabinets, disconnect switches, control devices, and similar equipment connected to the electrical systems shall be properly identified by means of engraved laminated plastic nameplates.

1.19.2 Nameplates shall be minimum 25 x 75 mm (1" x 3") with the minimum size of lettering 10 mm (3/8") high, thickness of 5 mm (3/16").

NAME		PLATE SIZES	
Size 2	1 line	12 x 70 mm	5 mm high letters
Size 5	2 lines	20 x 90 mm	5 mm high letters

1.19.3 Nameplates shall be black and white lettering for all "normal" supply applications and red with white lettering for "Essential" supply applications.

1.19.4 Submit a complete list of all nameplates, including proposed inscriptions to the Consultant for approval prior to placing the order for the manufacture of the nameplate.

1.19.5 Wording on nameplates to be approved by Engineer prior to manufacture.

1.19.6 Allow for average of twenty-five (25) integers per nameplate.

1.19.7 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

1.19.8 Disconnects, starters and contactors: indicate equipment being controlled and voltage.

1.19.9 Do not use embossed plastic labels.

1.19.10 Nameplates shall be fastened to the equipment with adhesive backing and two self-tapping metal screws.

1.19.11 Pressure indented adhesive strip nameplates are not acceptable and shall not be used.

1.20 **Warning Signs**

1.20.1 Provide warning signs, as specified and/or to meet requirements of Inspection Department and the Engineer.

1.20.2 Use decal signs, minimum 175 mm x 250 mm size.

1.21 **Mounting Heights**

1.21.1 Install device Boxes (Switches and Receptacles) at mounting heights as follows (to centre line of device box):

.1 Panels and Fused switches so uppermost breaker or switch handle 2100.

.2 Light switches shall be located on the lock side of the door unless otherwise indicated or applicable, and shall be mounted at 1350 mm (*), unless otherwise indicated. (1050 for "Barrier Free" applications)

.3 Wall receptacles and telephone outlets 300 mm. unless otherwise indicated.

.4 Receptacles above counters 150 mm above splash back.

.5 Receptacles in washrooms 1200 mm.

.6 Clock outlets unless otherwise detailed 2100 mm.

.7 Receptacles in service and unfinished areas 1200 mm.

.8 Wall handset telephone outlets, 1500 mm (*).

.9 Television outlets, as specified on drawings.

.10 Data outlets, 300 mm.

.11 Emergency (Fire Alarm Communication) telephones, 1450 mm.

.12 Thermostats, 1500 mm or as indicated (line voltage only).

.13 Exit lights, 2100 mm or above door frame.

.14 Emergency battery and remote head, 2100 mm, unless otherwise indicated in warehouse areas.

.15 Dimmer switches 1350 (*).

.16 Time switches 1500.

(*) Note where the facility is designated "Barrier Free Access" this mounting height dimension to be changed to 1050 (42”).

1.22 **Short Circuit Protection and Bracing**

1.22.1 Short circuit protection equipment as referenced in the Table below shall be provided with RMS interrupting capacities and bracings.

Location	Voltage	Available Fault Current (1)	Required Circuit Breaker Symmetrical Inter'ting Capacity	Bus Bracing
Panel boards	120/208, 3ph, 4w	10,000	10,000	10,000
Panel boards	347/600. 3ph,4w	18,000	18,000	18,000

1.23 **Coordination of Protective Devices**

1.23.1 Ensure circuit protective devices such as over current trips, relays, fuses, are installed to values and settings as indicated.

1.23.2 Provide line current co-ordination curves on services over 1200 amperes to indicate co-ordination of protection components and that the equipment being protected is not subject to damaging fault current.

1.23.3 Ensure that the Service Entrance protection co-ordinates with the Utility's protection.

1.23.4 Unless Co-ordination dictates otherwise, set ground fault protection devices at the maximum pick-up and time setting.

1.24 **Load Balancing**

1.24.1 Ensure at the completion of the installation that the loading on the respective panel boards, sub-distributions, and Main Distribution is balanced.

1.24.2 Ensure that any branch circuit adjustment to the panel boards and which includes single-phase loads is done in a manner that will maintain the present load balance.

1.25 **Voltage Ratings**

1.25.1 Operating voltages: to CAN3-C235-83.

1.25.2 Lighting fixtures and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in the above standard without damage to the equipment.

1.26 **Workmanship**

1.26.1 Install equipment, conduit and cables in a workmanlike manner to present a neat appearance and to function properly to the satisfaction of the Engineer. Install runs parallel and perpendicular to building planes. Install conduit concealed in chases, behind furring or above ceiling, except in unfinished areas or as indicated. Install exposed systems neatly and group to present a neat appearance.

1.26.2 Install all equipment and apparatus requiring maintenance, adjustment or eventual replacement with due allowance therefore.

1.26.3 Include in the work, all requirements of manufacturers shown on the shop drawings.

1.26.4 Replace work unsatisfactory to the Engineer without extra cost.

1.26.5 Make provisions to accommodate future plant and equipment indicated on Drawings.

1.27 **Work In Existing Areas (where applicable)**

1.27.1 Refer to electrical, architectural and mechanical drawings for related work by

other trades being undertaken under this Contract. Ensure that all the existing electrical features that could affect this work are isolated, adjusted as necessary and restored after the Trade Work is completed.

1.27.2 Examine the site and local conditions affecting the work to establish all information necessary for the work. No extra compensation will be allowed due to failure to make this examination.

1.27.3 Rewire, alter, modify, divert and extend existing wiring as herein specified and as may be required to provide the complete, approved and fully operative installation to the complete satisfaction of the Engineer.

1.27.4 Cutting and patching necessary for conduit work, etc. shall be by Division 26.

1.28 **Power Interruption**

1.28.1 Discuss with the Engineer any requirement for a power interruption.

1.28.2 Make submission to Landlord's representative in writing at least three (3) days in advance of the required outage.

1.28.3 Allow for working after normal hours to minimize the interruption to the Service Garage normal operation.

1.28.4 Ensure that Phase Rotation is maintained.

1.28.5 Co-ordinate the required power outages with any Power Outages the Utility may require.

1.29 **Operation And Maintenance Manuals**

1.29.1 Complete three bound manuals with hard covers, index and section tabs and submit to the Engineer prior to the completion of the electrical work.

1.29.2 Manuals shall contain the following information, plus any additional information requested by the engineer prior to the completion of the electrical work.

.1 Wiring diagrams and drawings of electrical equipment.

.2 Installation, operation and maintenance instructions for each item of electrical equipment required to be operated or serviced by unskilled users. Information shall include simple instructions for normal uses, maintenance schedules, servicing instructions, schematic and connection diagrams, parts and service suppliers.

.3 Technical data, product data, supplemented by technical bulletins, component illustrations, exposed views, technical description of items and parts list.

.4 The consultant reviewed shop drawings.

.5 Certificate(s) of acceptance from authorities having jurisdiction, i.e. Electrical Safety Authority and local Hydro company.

.6 Load balancing report.

.7 Written guarantee.

1.29.3 Operation and Maintenance information shall be limited to equipment supplied by the Electrical Trade.

1.30 **Instructions to Owner's Personnel**

1.30.1 The instructions shall be given during the Commissioning of the equipment and systems operation. The Contractor shall ensure that the parties responsible for servicing and maintaining the equipment and operating the equipment are present, during the commissioning phase, when skilled technicians are on site to instruct and respond to any questions.

1.30.2 Include in the tender price the cost of maintaining the electrical Foreman on the premises for one (1) day after the building has been formally taken over by the Owner, and all systems in the building are in an operative condition as satisfactory to the Owner. During this period, the electrical Foreman shall provide instructions to the Owner's personnel with respect to all the various systems in the building. The entire procedure shall be as per a pre-arranged schedule and shall be conducted to the complete satisfaction of the Owner and

Consultant. There shall be a concentrated instruction period and the Contractor shall obtain a signed affidavit that such instructions were given. A copy of which shall be placed in the Maintenance Manuals.

1.31 **Field Quality Control**

1.31.1 Temporary and Trial Usage

.1 Temporary and Trial Usage by Owner of any or electrical device, machinery, apparatus, equipment or any other work or materials supplied before final completion and written acceptance shall not be construed as evidence of acceptance of same by Owners.

.3 Carry out the operations only with the express knowledge and under supervision of the prime contractor who shall not waive any responsibility because of trial usage.

.4 Owners shall have the privilege of such Temporary or Trial Usage, as soon as the Contractor shall claim that said work is completed and in accordance with Drawings and Specifications, for such reasonable length of time as is deemed to be sufficient for making a complete and thorough test of same. Claims for damage shall not be made by Contractor for the injury or breaking of parts of such work that may be used, whether caused by weakness or inaccuracy of structural parts of by defective materials or workmanship of any kind whatsoever.

1.31.2 System Acceptance

.1 Submit to Engineer original copies of letters from the manufacturers of systems indicating that their technical representatives have inspected and tested the respective systems and are satisfied with the methods of installation, connections and operation.

.2 Named letters shall state the names of persons present at testing, the methods used and a list of functions performed with location and room numbers where applicable.

.3 Conduct acceptance tests to demonstrate that the equipment and systems meet the specified requirements. Conduct tests as soon as conditions permit. Make changes, adjustments or replacements required as the preliminary tests may indicate prior to final tests.

.4 Conduct as a minimum the following tests, at the commissioning of the respective equipment and systems:

Power distribution system including phasing, voltage, grounding and load balancing. Circuits originating from branch distribution panels, load balancing. Lighting and its control Motors, heaters and associated control equipment including sequenced operation of systems where applicable. Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project. Conduct final tests in the presence of the Engineer. Give the Engineer advance notice in writing that the preliminary test has been completed and that final tests are ready to be carried out. During the final tests demonstrate to the satisfaction of the Engineer that all equipment is operating as intended without noise and vibration.

.5 Supply services of trained specialists, ladders, tools and associated equipment to assist the Engineer in carrying out final tests.

.6 Furnish three copies, in typewritten form, of above reports along with check list noting the tests and adjustment that were made to each piece of equipment.

.7 Check the function of the control system and work with, Controls Section to obtain optimum performances.

.8 Investigate malfunctions and report to the Engineer.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Provide labour, materials, products, equipment and service to complete the Grounding Work.

1.1.2 All grounding of services, equipment, lighting, motors, feeders, conduits, transformers, meters, etc., shall be done in accordance with the electrical code and CSA C22.2 No. 41.

1.1.3 Exposed non-current-carrying metal parts of motor frames, panel boards, disconnect switches.

1.1.4 Provide bonding contractor between tenants sub service and building grounding grid in main electrical room.

2. **PRODUCTS**

2.1 **Materials**

2.1.1 Indoor ground connections other than busbar connections shall be made with approved solderless ground connectors; outdoor ground connections shall be by welding, using the thermit or cadweld process.

2.1.2 Ground rod electrodes shall be installed where shown and where required and shall be driven to the required depth for reaching permanent moisture. Minimum size of ground rods used shall be copper or copper-weld 19 mm diameter x 3 m long.

2.1.3 Busbar connections shall be by thermit or cadweld process.

2.1.4 All connectors shall be made of copper.

2.1.5 Solderless connectors shall be by Burndy or Thomas & Betts.

2.1.6 Thermit process connectors shall be by Burndy or Cadweld.

2.1.7 All ground conductors shall be copper

3. **EXECUTION**

3.1 **Installation**

3.1.1 Provide a green insulated grounding conductor for all metallic and non-metallic conduits. Size of grounding to suit electrical code requirements. Ground conductors shall be installed inside conduit or tubing containing the phase conductors.

3.1.2 Conduits installed in concrete slabs on grade and in concrete or in masonry exterior walls below grade shall have a green insulated ground conductor. The conduits shall not be relied upon for grounding continuity.

3.1.3 All ground connections underground and in places which will become inaccessible after installation, shall be made only by welding using the thermit process.

3.1.4 Measure the insulation value of all lighting and power circuit feeders and sub-feeders. If resistance between conductor and ground is less than that recommended by the electrical code, such circuits are to be considered defective and must be replaced.

3.1.5 For standard duplex receptacles provide insulated ground conductor, size for equipment ground in accordance with electrical code minimum conductor size #12 with green insulation. Ground conductor to be connected under bonding screw to outlet box(es) and panelboard.

3.1.6 For isolated ground duplex receptacles provide equipment grounding conductor as for receptacles and separate insulated ground conductor; size to match line conductors with green insulation and yellow strip. Isolated ground conductor to be connected to isolated ground terminal strip provided in panel.

3.1.7 Install separate ‘green’ ground conductor in same conduit with circuit (power wiring) conductors. Bond securely to ground screw in each outlet, junction, pull box, and equipment enclosure ground conductor equal in ampacity to size of circuit ampacity or in accordance with code for equipment grounding.

3.1.8 Measure with an Earth Megger, the resistance of each main service ground system that contains portions, i.e. ground rods and/or buried ground conductors, outdoors. Submit measurements, in writing, to Engineer for approval before any landscaping or paving is done on the site to allow for possible additional work to the ground system.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Section 260000 shall apply to and govern the work in this Section.

1.1.2 Provide labour, materials, products, equipment and service to complete the Device Box Work.

1.1.3 Device boxes shall conform to CSA Standard C22.2 No. 18-M1987.

2. **PRODUCTS**

2.1 **Materials**

2.1.1 Flush and surface mounted receptacle, junction and switch boxes shall be galvanised pressed steel (unless otherwise indicated), of size and type to suit the requirements of each device.

2.1.2 Exterior placed device boxes shall be a cast construction.

2.1.3 Single gang device boxes shall be no smaller than 100 mm (4") square with Commander Iberrville series square cut single gang cover to suit type of wall finish.

2.1.4 Sectional boxes shall not be used.

2.1.5 Device boxes in steel stud partitions shall be mounted with 450 mm (18") bar hangers.

2.1.6 Device boxes two gang or larger shall be Commander Iberville series gang boxes with gang box covers to suit type of wall finish.

2.1.7 Flush floor receptacles shall be complete with Nepco 800 box or Hubbell with adjustable ring and 5262 receptacle and brass cap.

2.1.8 Pressed metal boxes shall not be installed in public areas.

2.1.9 Outlet boxes installed in concrete block constructions shall be single or gang masonry boxes of sufficient depth to allow conduit to pass through the centre of the block. Minimum depth of boxes shall be 63 mm (2 1/2").

2.1.10 Where 100 mm square outlet boxes are installed in exposed masonry in finished areas, masonry blocks shall be cut under Masonry Division as directed under this Section. The Contractor shall ensure that masonry openings are the exact size of the box and the amount of mortar to fill the voids between box and block is not excessive.

2.1.11 Ceiling boxes shall be 100 mm octagon or square, complete with fittings, where required to support fixtures.

3. **EXECUTION**

3.1 **Installation**

3.1.1 For mounting height of receptacle and switch device boxes refer to Section 260000.

3.1.2 Device boxes shall be installed plumb and adequately fastened so that boxes are not misalign by the work of other Trades (eg. Drywall trade)

3.1.3 Provide a suitable device box for each light switch, receptacle or other device, approved for the particular area in which it is to be installed.

3.1.4 Support device boxes independently of conduit and cable.

3.1.5 Locate device boxes, mounted in suspended ceiling space, so they do not obstruct or interfere with the removal of lay-in ceiling tiles.

3.1.6 Do not install device boxes back to back in common walls. Separate by one stud space or block member so as to minimise sound transmission between adjacent rooms.

3.1.7 Use multiple device boxes at locations where more than one device is to be mounted. Use combination boxes with suitable barriers where outlets for more than one system are shown. Ganged boxes not acceptable.

3.1.8 Device boxes applicable to wall receptacles, switches, telephone outlets, etc., located in exposed concrete block, or ceramic tile walls shall be saw-cut into the top to bottom edge of the nearest course of block or tile at a height nearest the specified elevation, and the height shall be uniformed throughout the project opening shall be of minimum size required to take the outlet box and such that

the device cover plate will conceal the cut.

3.1.9 Mount dimmer switch device boxes where over 600W rating to allow for the over sized dimmer switch, if such is applicable.

3.1.10 Where device boxes are located within 1500 mm of a mechanical device such as a thermostat, co-ordinate with the mechanical trade to ensure that the units are located to the approval of the Engineer.

3.1.11 Final rough-in locations of all floor device boxes shall be as referenced on the architectural drawings and equipment layout drawings.

3.1.12 Device boxes located in counters or furniture shall be mounted and coordinated with system furniture installer on site.

3.1.13 Terminate conduit entering pressed metal device boxes or enclosures with nylon insulated steel threaded bushings.

3.1.14 All wiring devices, clock outlets, telephone outlets etc. shall be mounted in accordance with the drawings, unless otherwise directed.

3.1.15 For light switch device boxes shown at door entry position, mount on latch side. Refer to Architectural Drawings to confirm door swing shown on the Electrical Drawings is correct.

3.1.16 All measurements listed, unless otherwise noted, refer to centre line of device from finished floor.

3.1.17 Boxes and fittings placed on exterior walls or in insulated ceilings shall be provided with preformed plaster vapour seal back box such as supplied by Mold Processors Ltd. 3145 North Talbot Rd., Old Castle, Ontario (Iberville equivalent). Note boxes to be properly shaped and sized to accommodate the electrical boxes common to the branch circuit application.

3.1.18 The Division .26 Contractor shall ensure that the back boxes are sealed to the building vapour barrier membrane. The methods to be employed by the respective trades are to be first reviewed with the Architect or Engineer.

3.1.19 The conduit and AC90 cable entries to such boxes are to be minimised. Where applicable the plastic back box shall be made captive under the shoulder of the associated conduit or AC90 connector.

3.1.20 Any open wiring connections and splices shall be made within a pressed metal junction box having grommets applied to the cable entry openings.

3.1.21 The flush mounted exterior device boxes shall be either the cast type or masonry block type so that the cover can be fastened with four screws.

3.1.22 Pull boxes shall be galvanised sheet metal with covers fastened by metal screws. Pull boxes shall be large enough to accommodate wiring without crowding. Pull boxes and junction boxes shall be accessible at the completion of the Contract.

3.1.23 Exterior positioned receptacle boxes shall be of cast construction, and have weatherproof unbreakable plastic covers.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

Section 260000 shall apply to and govern the Work of this section.

2. **PRODUCTS**

2.1 **Materials**

2.1.1 Low Voltage Electrical Power Conductors and cables to Section 260519.

2.1.2 Conduit to Section 260533.13.

2.1.3 Circuit Breakers to Section 262816.13.

2.1.4 Pull boxes and wireways to Section 260533.16.

3. **EXECUTION**

3.1 **Installation**

3.1.1 Division 23 shall supply and install all electrical motors, thermostats, float switches, pressure switches, flow switches, safety devices, dampers and aquastats, relating to Mechanical equipment.

3.1.2 Division 23 shall supply all starters complete with pilot lights, remote control stations, and control transformers. Division 26 to install and connect incoming power supply.

3.1.3 Division 23 shall supply and install all isolating disconnect switches for all Mechanical equipment as required by code.

3.1.4 Division 26 shall provide all power wiring from source to local starters and control panels. Division 25 shall install conduits, power and control wiring from control panels and starters to individual mechanical equipment.

3.1.5 Power wiring is defined as all single or three phase wiring carrying the full current of the mechanical equipment, rated 120VAC or higher.

3.1.6 Division 23 shall provide all control wiring, 120VAC and lower.

3.1.7 Division 23 shall provide detailed wiring diagrams for each motor.

3.1.8 All work performed by Division 23 shall meet Division 26 specifications.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

Provide labour, materials, products, equipment and services to complete the work of this Section.

2. **PRODUCTS**

2.1 **Material**

2.1.1 Pull boxes shall be:

2.1.1.1 Code gauge thickness steel.

2.1.1.2 Bolt on covers.

2.1.1.3 Suitable for surface or flush mounting. Pull boxes shown on drawings are the main boxes, provide others as required.

2.1.2 Acceptable manufacturers:

2.1.2.1 W.P. Pursley.

2.1.2.2 Bel Products.

3. **EXECUTION**

3.1 **Installation**

3.1.1 Wherever necessary for proper installation or anchoring of cables whether shown on the Drawings or not, pullboxes, junction boxes, or cable anchor boxes shall be installed.

3.1.2 Pullboxes, junction boxes, cable anchor boxes, splitter boxes, splitter troughs, etc., shall be suitable for the application and location in which they are used. Where joints are made inside any of the above boxes these shall be equipped with terminal blocks with screw terminals for each wire.

3.1.3 Boxes shall be located so as to be accessible after the building is completed. Supply access panels where required to make boxes accessible.

3.1.4 Break up long conduit runs by a sufficient number of pull boxes to make pulling of wire easy.

3.1.5 Size pull boxes as required by the inspection department.

3.1.6 In no case will a conduit run be more than 30 m (100'-0").

3.1.7 Locate boxes in service areas, storage rooms and inconspicuous places.

3.1.8 Mark location on the record drawings.

3.1.9 Install and connect splitters as shown.

3.1.10 All splitter enclosures shall be grounded.

3.1.11 Provide Lamacoid, size 3, nameplate with typical inscription to suit system, i.e.: "Splitter - 200AMP, 208/120V, 3 Phase, 4 Wire".

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

Section 260000 shall apply to and govern the Work of this Section.

1.2 **Related Work**

Outlet boxes – Section 260533

2. **PRODUCTS**

2.1 **Material**

2.1.1 Receptacles – General application:
- 2.1.1.1 "U" ground type.
- 2.1.1.2 Nylon face (most durable material).
- 2.1.1.3 Side or back wired.
- 2.1.1.4 White colour.
- 2.1.1.5 Specification conforming product: Leviton or Hubbell.
- 2.1.1.6 Leviton Decora 5325-W, (Hubbell 2152WA) (specification grade).
- 2.1.1.7 Specification grade Hubbell 8200W (hospital grade).

2.1.2 Isolated Ground Receptacle:
- 2.1.2.1 "U" ground type.
- 2.1.2.2 Orange colour.
- 2.1.2.3 Specification Conforming products:
  Hubbell IG 2152 (specification grade)
  Hubbell IG 8200 (hospital grade)

2.1.3 Ground Fault Protected receptacle:
- 2.1.3.1 Note where receptacle subfeeds.
- 2.1.3.2 Fits standard device box.
- 2.1.3.3 White colour.
- 2.1.3.4 Including matching faceplate.
- 2.1.3.5 Hubbell GF15 OWL (office white commercial grade).
- 2.1.3.6 Hubbell GFR 8200 (hospital grade).

2.2 **Toggle Switches (120V)**

- 2.2.1 Specification Grade
- 2.2.2 A/C Quiet
- 2.2.3 White colour
- 2.2.4 Single pole or two pole as required
- 2.2.5 Single throw, 3-way, 4-way configuration as required
- 2.2.6 15A rated
- 2.2.7 Colour coded (as to amperage on housing cover)
- 2.2.8 Specification conforming product:
  - 2.2.8.1 Hubbell 2101-WA (Office areas)
  - 2.2.8.2 Leviton 5611-W (Office areas)

2.3 **Coverplates**

- 2.3.1 Weatherproof cover plates for receptacles shall be high impact plastic: Leviton 4941 P
- 2.3.2 Flush mounted: smooth line plastic colour to match device
- 2.3.3 Flush mounted in office areas: screwless snap-on wallplates Leviton 80301-W series.

3. **EXECUTION**

3.1 **Installation**

- 3.1.1 Provide receptacles, switches and outlets as specified herein and as indicated on Drawings.
- 3.1.2 All devices shall be installed plumb.
- 3.1.3 All receptacles shall be grounded.

3.1.4 Provide isolated ground connection as per latest edition of Ontario Electrical Safety Code.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

Section 260000 shall apply to and govern the work in this section.

1.2 **Related Work**

Conductors and cables: Section 260519.

1.3 **Location Of Conduit**

Drawings do not show all conduits. Generally, those shown are in diagrammatic form only.

1.4 **Relevant Standards**

1.4.1 Rigid threaded hot dipped galvanised steel conduit to CSA C22.2 No. 45.M1981.
1.4.2 Rigid electrical metallic tubing (EMT) to CSA C22.2 No. 83.M1985.
1.4.3 Rigid PVC conduit, Type II, to CSA C22.2 No. 211.1.M1984.
1.4.4 Rigid PVC conduit, Type I, CSA C22.2 No. 211.1.M1984.

2. **PRODUCTS**

2.1 **Electrical Metallic Tubing (EMT)**

2.1.1 Basic building wiring method.
Refer to Part 3 of this Section

2.2 **Rigid Galvanized Steel Conduit**

2.2.1 Applied in areas where conduit run will be subject to mechanical damage.
2.2.2 Applied to below grade applications.
2.2.3 Applied to areas of Hazardous Construction (Section 18 of the Code).
2.2.4 Factory threaded c/w coupling.

2.3 **Rigid Aluminum Conduit**

2.3.1 Applied in areas where conduit run will be subject to mechanical damage.
2.3.2 Applied to areas of Hazardous Construction (Section 18 of the Code).
2.3.3 Factory threaded c/w coupling.

2.4 **Rigid PVC Conduit**

2.4.1 Applied for below grade applications.
2.4.2 Applied for circuits run in cast-in-place concrete.
2.4.3 C/W solvent welded couplings.
2.4.4 Having preformed bends.
2.4.5 C/W associated fittings.
2.4.6 Approved manufacturers: Sceptre

2.5 **Flexible Conduit**

Applicable to fixture drops, small hp motors connections & connection to control components.

2.6 **Liquid Tight Flexible Conduit**

2.6.1 Applicable roof top equipment connections, condenser unit connection.
2.6.2 Approved manufacturer: Liquiseal

2.7 **CSA Approved "Polypipe"**

2.7.1 Supplied in coils.
2.7.2 For in slab (small diameter conduit runs).

2.8 **Wireways**

2.8.1 Surface applications in existing construction or to facilitate multiple receptacles specialised outlets.

2.8.2 Ivory colour.

2.8.3 Approved manufacturer: Wiremold

2.9 **Expansion Joints**

2.9.1 Telescopic type for rigid PVC conduit.

2.9.2 Two 90 deg. bends for rigid galvanised steel or EMT conduits.

2.9.3 Short length of "Liquiseal" Flex.

2.10 **Conduit Fastenings**

2.10.1 One hole malleable iron galvanised steel straps to secure surface conduits 50mm (2") and smaller. Two hole steel straps for conduits larger than 50mm (2").

2.10.2 Beam clamps to secure conduits to exposed steel work.

2.10.3 Channel type supports for two or more conduits at Code conforming spacing.

2.10.4 Six mm dia. threaded rods to support suspended channels. (Trapeze support).

2.11 **Conduit Fittings**

2.11.1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.

2.11.2 Factory "ells" where 90o bends are required for 50mm (2") and larger conduits.

2.11.3 Conduit Hubs (O-Z Gedney CH Series) for metal enclosure conduit entries).

2.12 **Conduit Connections**

2.12.1 Insulating type bushings at terminations of conduit.

2.12.2 EMT connectors (Interior): Subscrew type.

2.12.3 EMT connectors (Exterior): Water tight type.

2.12.4 "Liquiseal" conduit: Approved by manufacturer fittings.

3. **EXECUTION**

3.1 **Installation**

3.1.1 All conduits surface or concealed in ceiling spaces, shall be run parallel to building lines.

3.1.2 Generally shall be run concealed. Conduits run in unfinished areas such as mechanical or electrical rooms may be surface run, preferably with no horizontal runs below 2400mm (8').

3.1.3 Conduits shall be sized as per Electrical Code. Where conduit sizes are shown on drawings, these are the minimum and in no case shall be reduced without the approval of the Engineer.

3.1.4 Conduit shall enter properly and shall be secured to all fittings outlet boxes, et cetera, by means of locknuts and bushings that shall be screwed up tightly to ensure a perfect mechanical and electrical bond.

3.1.5 Where conduits cross building expansion joints, provide conduit expansion joints. Location of expansion joints shall be taken from architectural and structural drawings.

3.1.6 Running threads shall not be used.

3.1.7 All conduit ends shall be reamed to remove burrs and sharp edges.

3.1.8 Conduit shall be laid out so as to avoid interference with other work and so that it can drain with no pockets in which water can collect.

3.1.9 Conduits shall be at least 50mm clear of all mechanical pipes, flues, etc.

3.1.10 All rigid steel conduits shall be supported with galvanised two-hole pipe clips; EMT conduit shall be supported with steel one-hole clips; or by hangers, with supports at intervals specified in electrical code. "Caddy clips" are an acceptable method of conduit attachment to structural members. Wire type supports are not acceptable.

3.1.11 Field made offsets and offsets shall be uniform and symmetrical

without flattening of conduit. Minimum bending radius shall be 10 times conduit diameter. Where two or more exposed conduits are running parallel and close to each other. The offsets shall be congruent.

3.1.12 Run empty raceways for future loads and systems where shown on the drawings. Terminate raceways in a junction box or with a coupling and cap or plug as shown where it can be easily found at a future date. Show exact location of the termination of the raceways on the record drawings.

3.1.13 Provide a minimum of 1200mm and a maximum of 3000mm flexible steel conduit from the outlet box to recessed lighting fixtures.

3.1.14 Do not use rigid PVC conduit where normal conditions are such that any part of the conduit is subject to a temperature in excess of 75°C.

3.1.15 Protect rigid PVC conduit where exposed to mechanical damage.

3.1.16 Do not make field bends in rigid PVC conduit.

3.1.17 Install separate ground conductor in rigid PVC conduit in compliance with the Canadian Electrical Code.

3.1.18 Only rigid PVC conduit and associated fittings shall be imbedded in cast in place concrete.

3.1.19 Conduits in concrete or masonry shall be securely held in place during pouring and construction. Cap conduit during pouring with interlocking plastic "space caps" to prevent conduit damage and maintain the proper spacings.

3.1.20 Conduits which are required to be installed, but are left empty shall be tested for clear bore and shall be left with fish wire and shall be sealed at both ends to prevent entrance of dirt and moisture.

3.1.21 Where a conduit pierces a fire rated wall or floor, seal the opening with suitable material as referenced under 260000.

3.1.22 Branch and feeder circuit conduits passing from exterior areas or cold areas to warm areas shall be provided with filled EYS fittings.

3.1.23 Group conduits wherever possible. eg. applicable to trapeze hangers.

3.1.24 Trapeze hangers shall be galvanised members or specialised product eg. "Cantruss" c/w galvanised rod and nuts. Keep trapeze member clear of Mechanical piping and architectural and structural features.

3.1.25 Provide "WIREMOLD" raceways c/w mounting hardware, elbows, couplings, conduit connectors and receptacle boxes where shown.

3.1.26 Empty raceways for telephone systems, security systems, data gathering systems or any other systems where the Division 26 scope only includes the raceway (conduit) system provide a polypropylene pull cord.

3.1.27 For the project the wiring methods shall be as outlined below for assemblies and building elements common to the particular construction activity.

.1 **Branch Circuit Wiring**

Steel Stud Walls	AC90 (BX)
Masonry Block	Conduit encased R90 conductors
Crawl Space	Conduit encased R90 conductors
Ceiling Space	Conduit encased R90 conductors
Existing Construction (Fishing methods)	AC90 (BX)
Surface Wiring	Conduit encased R90 conductors

.2 **Systems Wiring**

Steel Stud Walls	AC90 (BX)
Masonry Block	Conduit encased R90
Existing Construction ("Fishing" methods)	AC90 (BX)
Ceiling Space	Conduit encased R90
Crawlspace	Conduit encased R90

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

Section 260000 shall apply to and govern the work of this section.

1.2 **Related Work**

Conduit, Conduit fastenings and Conduit Fittings Section 260533.13

2. **PRODUCTS**

2.1 **Materials**

2.1.1 Only Copper conductors shall be applied.

2.1.2 Minimum conductor size is #12 AWG.

2.1.3 Conductors Sizing Basis:

2.1.3.1 Table 1 and 2 of the Code.

2.1.3.2 Rw90 Insulation is the standard.

2.1.3.3 Conductor sizing has been done with consideration of voltage drop.

2.1.3.4 Conductors sized on basis of balanced three phase loads and it is a Contract requirement that such results.

2.1.3.5 Emergency lighting DC conductor sizing #10 AWG minimum conductor size.

2.1.3.6 Control circuits (120V) minimum conductor sizing #14 AWG.

2.1.3.7 Conductors for circuits greater than 15 amps, and for which size is not shown on the drawings, shall be sized for current-carrying capacity of breaker or fuse protecting them, and to limit the voltage drop at the outlet to 2 per cent as shown in Table "D3" of the Electrical Code.

2.1.3.8 Conductors: stranded for 10 AWG and larger.

2.1.3.9 Branch circuit wiring and feeders copper conductors: size as indicated, with 600 1000 V insulation of chemically cross-linked thermosetting polyethylene material rated RW90, XLPE or RWU90, XLPE, -40 deg.C where direct buried or installed in buried conduit.

2.1.3.10 Control circuits (120 volt) copper conductors: size as indicated, with thermoplastic insulation type TW, R90.

2.1.3.11 Aluminium conductors may not be used in lieu of copper conductors.

2.1.3.12 Conductors shall be colour coded as follows:

120/208 Volt System	600 Volt System
Line 1 - Red	Line 1 - Orange
Line 2 - Black	Line 2 – Brown
Line 3 – Blue	Line 3 – Yellow
Neutral – white	Neutral – white
Ground conductor - green	Ground conductor – green
Insulation rated for 600V	1000V

2.1.3.13 Conductors without coloured insulation shall be identified at each outlet box and termination with a 150mm (6") band of vinyl tape of the proper colour. Neutral conductors shall be identified. Paint or other means of colouring conductors shall not be used.

2.1.3.14 Conductors used for exterior wiring shall be suitable for installation at minus 40^{o}F.

2.2 **Materials**

2.2.1 Armoured Cables (Fixture Drops and steel and wood partition branch circuitry wiring)

2.2.1.1 Conductors: insulated, copper, size as indicated.

2.2.1.2 Type: AC90.

2.2.1.3 Armour: interlocking type fabricated from aluminum strip.

2.2.2 Control Cables
- 2.2.2.1 Low energy 300V control cable: solid stranded annealed copper conductors sized as indicated, with PVC insulation type TW -40^{o}C TWH polyethylene insulation conduit encased.
- 2.2.2.2 Where not conduit encased, have CSA FT4 and FT6 Flame Test rating and for application consistent with Sections 16 and 32 of the Ontario Electrical Safety Code.

2.2.3 Aluminium Sheathed Cables ("Corflex")
- 2.2.3.1 1/C or multi conductor assembles as shown.
- 2.2.3.2 c/w PVC jacket (-40o Rated).
- 2.2.3.3 RA90U, ACW 90 or Teck.
- 2.2.3.4 Run so Free Air Rating (Table 1) results.
- 2.2.3.5 1/C cables terminated so ground currents minimised and Eddy currents eliminated.
- 2.2.3.6 Terminated in approved connectors.

2.2.4 Fire Alarm cable (open wiring), interlock armoured CSA FT-4 cable. Applicable Canada Wire Trade Name Securex II.

2.2.5 Co-axial cables Belden 8760. Conduit encased.

2.2.6 L.V.T. open wiring CSA FT-4. Fire rated packed.

2.2.7 Acceptable manufacturers:
- 2.2.7.1 Canada Wire – Alcatel
- 2.2.7.2 Nexans
- 2.2.7.3 Belden
- 2.2.7.4 Alcan
- 2.2.7.5 Phillips
- 2.2.7.6 Pirelli

3. EXECUTION

3.1 Execution Of Work

3.1.1 Install conductors sized and with the insulation type as shown on the Drawings unless Code requirements direct otherwise.

3.1.2 Conduit Fill shall be as per Table 6 of the Code.

3.1.3 AC90 (BX) cables shall not be run surface mounted unless otherwise stated on the Drawings.

3.1.4 Fixture drops (AC90 shall be sufficient to allow for minor adjustment of the fixtures (eg. moved one tile).

3.1.5 Generally, unless otherwise shown on the drawings or herein specified or required by the Electrical Code, conductors run in conduits, ducts or other raceways shall be R90 insulation.

3.1.6 Where conductors terminate in lugs, ensure the lugs accommodate all the strands of the conductor. Where insulation is stripped to accommodate the lug, ensure the conductor is neatly taped up, equal to insulation removed, so that the lug only is exposed.

3.1.7 When the project is ready for the pulling of wires, ensure all raceways are dry and free from condensation.

3.1.8 Where moisture is present in the raceway, carefully dry out before the wire is drawn in.

3.1.9 Replace any wire or cables showing evidence of mechanical injury.

3.1.10 When using "Corflex" single conductor cables, the length of cable in each phase must be equal to those of the other phases, as well as to each other when there is more than one cable per phase. Provide a separate bare copper ground conductor sized as shown. Terminate cables as shown and per Manufacturer's recommendations. Cable clamps and bolts shall be non-magnetic metallic hardware; i.e. aluminum and brass.

3.1.11 Single conductor corflex cables shall be spaced 1 diameter apart and installed in

such a manner that they will qualify for their free air current rating and cables 1/0 and larger shall be installed to have no sheath current. Cables shall be PVC jacketed with FT4 classification (indoors) and where installed for no sheath current shall be installed on insulated supports to prevent sheath currents. Provide fire rated enclosure where cables run through return air plenums and fire rated exits.

3.1.12 Method of installation shall conform to the electrical code.

3.1.13 Provide cable support boxes on riser cables as required by code.

3.1.14 Where aluminum sheeted, (Teck or Corflex) and mineral insulated cables are specified they shall have copper conductors sized as shown on the drawings. Termination of cables shall be as per manufacturer's recommendations so as to ensure no sheath currents flow and eddy currents are eliminated.

3.1.15 Teck and Corflex cables shall be PVC jacketed. Mineral Insulated cables shall where installed below grade or in moist areas have a PVC jacket.

3.1.16 Cables shall be properly clipped and protected against mechanical injury. Clips shall be single conductor non-ferrous type.

3.1.17 Cables shall be installed on building surfaces, cable trays and trapeze hangers. Cables shall not rest on mechanical pipes, ducts conduits or ceiling nor shall they be supported from pipes, ducts or conduits. Support spacing shall be as the manufacturer recommends.

3.1.18 Provide ULC approved fire rated techniques where cables run through return air plenums and fire rated walls.

3.1.19 Control wiring shall be of type and size required for that particular system and voltage. Unless multiconductor cable is specified minimum #14 AWG shall be used.

3.1.20 Wire connections shall be made with pressure type solderless connectors. Wire connection shall be twisted prior to splicing and shall be insulated with vinyl insulating caps and locking rings. Provide pigtails for all electrical fixtures and devices to ensure that neither the neutral or the power supply lines are opened when a fixture or a device is removed from the circuit. Use “IDEAL” brand marretes for conductors up to size #6 AWG; use lug set screw type for larger conductors.

3.1.21 For multiple (parallel conductor) runs of cable, test for equal load sharing. Configuration to comply with Code requirements and manufacturer recommendations.

3.1.22 Wiring for the D.C. circuits of emergency lighting and exit lighting shall be minimum #10 AWG or as shown. All wiring shall be in metal conduit.

3.2 **Wiring Termination**

Lugs, terminals & screws used for termination of wiring to be suitable for copper conductors.

3.3 **Insulation Resistance**

3.3.1 Megger circuits, feeders and equipment up to 350 Volts with a 500 Volt instrument.

3.3.2 Megger 350-600 Volt circuits, feeders and equipment with a 1000 Volt instrument.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Standard:

.1 CSA C22.2 No. 5.

2. **PRODUCTS**

2.1 **Material**

2.1.1 Moulded-Case circuit breakers 208VAC or less:

2.1.1.1 Provide ratings as per drawings and install in respective panels.

2.1.1.2 Provide lock-on devices where shown.

2.1.1.3 Provide GFCI type breakers where shown.

2.1.1.4 Breaker minimum interruption capacity rating (symmetrical RMS valve) shall not be less than following:

@ 240V – 18KA

@ 120V – 10KA

2.1.1.5 Manufacturer: to match panel boards.

2.1.1.6 Quick-made, quick-break.

2.1.1.7 Ambient compensated for +40 deg. C.

2.1.1.8 Common trip on all multi-pole breakers.

2.1.1.9 Trip indication clearly shown by breaker handle taking position midway between ON and OFF.

2.1.1.10 Thermal magnetic coil trip provide instantaneous opening on low current faults of 10x or larger and time-dependent opening on overloads between 1.5x and 10x.

2.1.1.11 Bolt-on.

2.2 **Enclosures:**

Provide EEMAC 2 enclosures for circuit breakers, where shown.

3. **EXECUTION**

3.1 **Installation**

3.1.1 Install circuit breakers of the type required in panel boards or separate enclosures as shown. Apply proper torques to manufacturers recommendations.

3.1.2 Make all feeder and branch circuit wiring connections as shown.

3.1.3 Provide Lamacoid, size 2, nameplates for circuit breakers in separate enclosure.

END OF SECTION

1. **GENERAL**

1.1 General Requirements

Section 260000 shall apply to and govern work of this Section.

1.2 Related Work

Circuit Breakers.

2. **PRODUCTS**

2.1 Panelboards

2.1.1 Panelboard shall be surface or flush mounted as shown on the drawings and c/w breakers, spares and spaces as shown. Bus capacity and construction shall be as shown.

2.1.2 Where indicated for certain areas, the panelboard shall be complete with main breaker for "on-off" purposes.

2.1.3 Breakers shall have thermal and magnetic trip, trip free, trip indicating with trip valves as shown on the drawings and be the bolted-on type "NB" minimum 10,000 Amperes Symmetrical I.C. at 120V AC. Breakers shall have interrupting capacity to withstand short circuit currents as indicated or as deemed correct through co-ordination concepts reviewed with the Engineer. Two and three pole breakers shall have a common trip.

2.1.4 "Duplex, 13mm" or "twin" breakers are not acceptable. Breakers shall be minimum 1" width.

2.1.5 Buswork in panelboards shall be copper.

2.1.6 Where flush mounted panelboards are to be installed in walls thinner than the panelboard depth, special trims with rolled back edges shall be supplied. Panel shall have concealed cover attachment screws.

2.1.7 Current carrying capacity of panelboard assemblies shall be at least equal to that of the feeder supplying it.

2.1.8 All panelboards shall be of the same manufacturer.

2.1.9 Supply and install circuit breaker "lock device" on circuits designated in panelboard schedule, or as outlined below, or as indicated in panel schedules:

2.1.9.1 Exit Light
2.1.9.2 Control circuits
2.1.9.3 Security system
2.1.9.4 Door Locks
2.1.9.5 Emergency Lighting
2.1.9.6 Time switches
2.1.9.7 Communication equipment

2.1.10 Each circuit breaker shall be indentified with a permanently fixed number, either engraved in a lamacoid strip or stamped in a metal panel front. Any other numbering methods are not acceptable. Lamacoid strips shall be secured with metal screws. Circuit breakers shall be numbered vertically in odd and even order.

2.1.11 Electrical panel feeding isolated ground receptacles shall have a second ground bar installed and ground extended to the ground bar from the ground bus. The second ground bar shall be isolated from the other panel grounds through stand off insulators.

2.1.12 Mount typewritten directory behind a plastic shield on the inside of panel door. The directory shall show the circuit number and complete description of loads connected to the circuits. Minimum size of directory shall be 113mm x 225mm (4 1/2 x 9") with circuit numbers in a vertical column.

2.1.13 The panel assemblies shall be complete with the required power supply and feed through lugs (where indicated). Where in excess of 42 breakers shown the assembly shall be side by side, cover assembly for the two panels, and have feed through lugs and equivalent sized bus conductors.

2.1.14 Panels shall have lockable doors with all locks keyed alike.

2.1.15 Panel covers shall be fitted with concealed trim screws concealed hinges and chromium plated lock and snap catch.

2.1.16 Electrical panels shall be sprinkler proof construction. Install drip hoods on existing panels indicated as existing to remain.

2.1.17 Panels shall be supplied with built in isolated ground bus where indicated.

2.2 **Approved Panel Board Manufacturers**

2.2.1 Schneider Canada / Square D

2.2.2 Cutler Hammer

2.2.3 Siemens

3. EXECUTION

3.1 Execution of Work

3.1.1 Panels shall be mounted to suit the wall member, so top breaker position is no higher than 2100.

3.1.2 Panels shall be mounted on non-combustible material.

3.1.3 Apply filler plates over unused breaker spaces to fit tightly into the panel interior face plate.

3.1.4 Circuit loads shall be balanced across phases as closely as possible.

3.1.5 Complete typewritten directories shall be provided on the inside of the door of each panel mounted in a metal frame and covered with transparent plastic using Room Description in lieu of Room #'s. Space and spare breaker positions shall have the position descriptions "Spare" or "Space" penciled in.

3.1.6 Where flush mounted panels are employed, four 1" empty conduits shall be extended to the ceiling space above and the crawl space or floor below where applicable.

3.1.7 Where there is a high incidence of AC90 (BX) or NMD-7 cables entering a surface mounted panel a preferred arrangement is an elevated wire-way and conduit "drops" to the panels.

3.1.8 The Panel supplier shall ensure that any panels which have a high incidence of Electric Heating Branch circuits (normally with 20 over-rated) breakers that the breakers will function properly. (Separate the upper most-heavier loaded electric heat circuit breakers by space positions).

3.1.9 Where there are more than two adjacent surface mounted panels or other similar equipment, same shall be mounted on a painted plywood backboard.

3.1.10 Load Balancing

3.1.11 Measure the phase current to all panels with normal load in operation at time of connections as required to obtain the best balance of current between phases and record all changes.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Conform to General Electrical Requirements, Section 260000

1.1.2 CSA C22.2 No.141 approved and ULC listed.

1.2 **Wiring**

1.2.1 Conductors to Section 260519

1.2.2 Conduit, conduit fastening and conduit fittings Section 260533.13

1.2.3 Outlet Boxes to Section 260533.16

2. **PRODUCTS**

2.1 **Manufactured Units**

2.1.1 Exit signs shall be as specified on drawings

2.1.2 Number of faces: as per drawings.

2.1.3 Exit sign shall be led type – full size panel 120V AC / 24V DC.

2.1.4 Letters: 3/4" wide x 6" high red letters, reading EXIT.

2.1.5 Universal chevron knockouts.

2.1.6 Mounting canopy – universal mounting.

3. **EXECUTION**

3.1 **Installation**

3.1.1 Install exit lights as indicated on drawings and in accordance with The Ontario Building Code.

3.1.2 All wiring shall be copper R90 #10 AWG in EMT conduit.

3.1.3 Connect fixtures to exit light circuits as indicated on drawings.

3.1.4 Connect emergency sockets to emergency circuits as indicated on drawings.

3.1.5 Ensure that supply panel circuit breaker for exit lights is locked in "on" position.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Section 260000 shall apply to and govern the work of this section.

1.1.2 Provide labour, materials, products, equipment and service to complete the work of this section.

1.1.3

1.2 **Standards**

Conform to CSA C22.2 No. 141., ULC listed.

1.3 **Wiring**

1.3.1 Conductors to Section 260519.

1.3.2 Conduit to Section 260533.13.

1.3.3 Outlet Boxes to Section 260533.16

2. **PRODUCTS**

2.1 **Materials**

2.1.1 Each emergency lighting system shall consist of the following:

2.1.1.1 The battery unit input shall be 120V AC, and output 24V, Battery life expectation shall be 10 years, maintenance free lead acid batteries, such as LumaCell "RS" series.

2.1.1.2 Transfer shall be by sealed relay, automatic and instantaneous, low voltage battery disconnect, including brownout protection.

2.1.1.3 Battery shall be quipped with the LumaCell Auto diagnostic Charger Microcontroller unit shall supply the rated load for a minimum of a 1/2 hour to 87.5 per cent of the rated battery/voltage. The charger shall be fully computer tested and its charge voltage factory set to ± 1 per cent tolerance. Chargers with field adjusted potentiometers are not acceptable.

A Pulse type charger shall be employed to promote long battery life and reduce the potential for grid corrosion. The charger shall provide a continuous high charge to recharge the battery. When the battery is at full capacity, the charger will shut off. Periodically the charger shall provide a Pulse of energy to keep the battery topped off. The Pulse charge shall be current limited and precisely regulated by a micro-processing circuit which samples the battery in relation to its temperature, state of charge and input voltage fluctuations. The charger shall be current limited, temperature compensated, short-circuit proof and reverse polarity protected. The unit shall be furnished with an electronic lockout circuit which will connect the battery when the AC circuit is activated, and an electronic brownout circuit which will activate the unit when utility power dips below 75 per cent of nominal voltage. A low voltage battery protection circuit shall be provided and will disconnect the load and circuitry from the fused output circuit when the battery reaches 87.5 per cent discharge. The unit shall self test for 1 minute every 30 days, 10 minutes on the 6th month and full discharge every 12 months. The unit shall be capable of full recharge in compliance with CSA specifications. The unit shall be furnished with sealed dust tight relay, a test switch and seven diagnostic LED indicator lights to continuously monitor the status of the unit: Battery Failed, Battery Disconnected, Charger Failure, Lamp Failure, Service alarm, AC "ON", Charger High Rate.

2.1.1.4 Battery shall be equipped with Advanced diagnostic system with time delay

2.1.1.5 Battery unit cabinet shall be made of 18-gauge steel, removable front.

2.1.1.6 Finish whist cabinet and front.

2.1.1.7 The battery systems shall be rated as shown on the Drawings.

2.1.1.8 The remote lamps shall be rated and of the type, as shown on the Drawings.

2.1.1.9 All wiring to be type RW10, gauge as shown on the Drawings.

3. EXECUTION

3.1 Installation

3.1.1 Install an emergency lighting battery system as shown on the drawings.

3.1.2 Install a CSA 5-15R receptacle mounted 200mm below finished ceiling (or as indicated on drawings), connected to circuits of the power panels as indicated on the drawings.

3.1.3 Wire remote lamps to nearest units shown on the drawings.

END OF SECTION

1. **GENERAL**

1.1 **General Requirements**

1.1.1 Section 260000 shall apply to and govern the work in this section

1.1.2 Supply and install interior lighting system as described in Contract Documents complete with lamps.

1.2 **Related Sections**

1.2.1 Conductors to Section 260519

1.2.2 Conduit, conduit fastening and conduit fittings Section 260533.13

1.2.3 Outlet Boxes to Section 260533.16

2. **PRODUCTS**

2.1 **Materials**

2.1.1 Lighting Fixtures – see Fixture Schedule Drawings

2.1.2 Fluorescent Ballasts – energy saving ballast with special warranty

2.1.3 Replace and install without extra cost to the owner, all defective or noisy ballasts for a period at one year and any incandescent lamp which fails within 30 days of take-over and any fluorescent lamps which fall within 90 days of takeover.

2.1.4 The flame spread and flame development rate of fixture lenses shall not exceed those permitted by the Ontario Building Code.

3. **EXECUTION**

3.1 **Execution of Work**

3.1.1 Luminaries shall have C.S.A. labels and shall be complete with lamps, ballasts and all necessary accessories for their hanging and mounting. Luminaries shall be installed in accordance with manufacturer's instruction

3.1.2 Unless otherwise indicated, support all lighting fixtures, including those mounted in suspended ceilings directly from the building structure.

3.1.3 Provide and install all necessary supports and hangers prior to installing the ceiling. All supports and hangers shall be of a non-combustible nature.

3.1.4 Co-ordinate the installation of luminaries with all trades to provide spacing intended

3.1.5 Recessed luminaries, in contact with insulation, shall have C.S.A. approval for that purpose.

END OF SECTION

1. **GENERAL**

1.1 **Section Includes**

Sound masking system

1.2 **References**

ASTM E1374-06 – Standard Guide for Open Office Acoustics and Applicable ASTM Standards.

1.3 **Performance Requirements**

1.3.1 Sound Masking Generation:

1.3.1.1 The masking sound generation shall be random and exhibit no noticeable pattern. Pseudo-random generation cycles shall exceed 1 month.

1.3.2 Sound Masking System Control:

1.3.2.1 The system shall be arranged into groups of speakers (zones) based on common installation, localized acoustical conditions, and client requirements.

1.3.2.2 Sound masking controls shall include:

.1 Overall system volume adjustability

.2 Volume tapings on each speaker for fine tuning

1.3.3 Measured Performance Requirements

1.3.3.1 All areas shall conform to the masking sound levels as follow:

.1 Open Offices-45 dBA

.2 Private Offices-42 dBA

.3 Meeting Rooms-42 dBA

1.3.3.2 The sound masking system shall provide spatial uniformity of +-2dBA for the overall sound masking sound level in each type of space.

1.3.4 Reporting Performance:

1.3.4.1 The hardware control panel(s) and software control application shall be capable of reading and displaying the current volume settings.

1.3.5 Security Performance:

1.3.5.1 Electronic Security Measures

.1 The system shall store settings in non-volatile memory.

1.4 **Submittals**

1.4.1 Bids with incomplete submissions per this section shall be rejected

1.4.2 Product Data – Manufacturer's specifications and installation instructions.

1.4.3 System Design – Schematics of the system showing quantity and location of components and related cabling and accessories.

1.4.4 Warranty Documents covering the system components and installation as per Section 275119.

1.4.5 Regulatory Testing and Certifications – Provide proof of compliance with certifications and identified in Section 275119

1.4.6 Specification Compliance Statement – A signed compliance statement from an executive officer of the manufacturer stating that the system **as proposed to the customer** will meet the design and performance requirements outlined in Section 275119 herein. The statement shall indicate compliance/non-compliance for each individual section and subsection of this specification.

1.5 **Quality Assurance**

1.5.1 Manufacturer Qualifications – Minimum of 10 years manufacturing sound masking systems.

1.5.2 System Design – Performed by an approved manufacturer representative.
Installer Qualifications – Approved by manufacturer representative and trained with the specified products or have demonstrated experience with the installation of similar products to those specified.

1.5.3 System Adjustment – Done by an approved manufacturer representative or trained contractor.

1.5.4 Single Source Responsibility – Source electronic masking components, loudspeakers wall controls and cables from a single manufacturer.

1.6 **Delivery, Storage and Handling**

1.6.1 Protect from moisture during shipping, storage and handling.

1.6.2 Deliver in manufacturer's original unopened and undamaged packages with manufacturer's labels legible and intact

1.6.3 Inspect manufacturer's packages upon receipt

1.6.4 Handle packages carefully

1.7 **Warranty and Maintenance**

1.7.1 Provide a written warranty from the manufacturer that products installed shall be free of defects in parts or assembly for a two-year period from date of first use.

1.7.2 Provide a written warranty from the vendor that installation will be guaranteed for a one year period from date of first use.

1.8 **Regulatory Testing and Certifications**

1.8.1 The system components shall conform to:

1.8.2 Canada

1.8.2.1 Safety and Electrical
60065-Standard for Audio, Video and Similar Electronic Apparatus Safety Requirements. Products shall be labelled accordingly.

1.8.2.2 Electromagnetic Interference (EMI)
ICES-003 (Industry Canada)-Interference- Causing Equipment Standard.

1.8.2.3 Cabling
i. UL CL3P/CMP 75C. Products shall be labelled accordingly.

1.8.2.4 Heavy Metals
RoHS – Restriction of Hazardous Substances (voluntary)

1.8.2.5 Low Voltage Power Supplies
UL1310 Standard for Class 2 Power Units. Products shall be labelled accordingly.

2. **PRODUCTS**

2.1 **Manufacturers**

2.1.1 Acceptable Manufacturers and Systems:

2.1.1.1 Soundmask Canada

3. **EXECUTION**

3.1 **System Design**

3.1.1 Designing a system according to manufacturer's specifications and conforming to requirements in this specification.

3.2 **Examination**

3.2.1 Ensure that facility build out is at a stage suitable for the system installation

3.2.2 Ensure that facility is constructed according to plans including wall locations ceiling types and plenum barriers.

3.2.3 Ensure that the plenum height is appropriate as per manufacturer's recommendations and as per plan.

3.2.4 Ensure power requirements have been provided as per plan.

3.2.5 Ensure sufficient space for centrally located components is available as per plan and manufacturer's specifications.

3.2.6 Ensure any third party components required to be interfaced with the system have been provided.

3.3 **Permits**

Obtain necessary permits for installation work.

3.4 **Installation**

3.4.1 Follow all applicable code for the area.

3.4.2 Follow manufacturer's recommendations regarding installation as found in the manufacturer's installation manual.

3.4.3 Follow system design for location of loudspeakers and wiring.

3.4.4 Install below-ceiling equipment in a location determined by the Consultant

3.4.5 Cabling shall be installed:

3.4.5.1 To avoid damage to cable conductors or housing. Damaged cable shall be replaced.

3.4.5.2 To provide strain relief at each speaker/component location.

3.4.5.3 Such that multiple cables between in-ceiling components shall be bundled together at intervals not exceeding 1.8m (6 feet).

3.4.5.4 Such that, in open ceiling environments, cables shall be properly supported in at least one location mid-point between Speakers components.

3.4.5.5 Near the deck. Cables shall not rest on the ceiling tile.

3.4.6 Record any necessary on-site changes to the system design on the plan and include in final system documentation.

3.4.7 Connect all power to dedicated electrical circuits. Total power consumption shall not exceed breaker amperage.

3.4.8 Ensure that supplementary materials used meet applicable safety standards.

3.5 **Field Quality Control**

3.5.1 Ensure that plenum heights meet the minimum recommended by the manufacturer for the loudspeakers.

3.5.2 Ensure that distance between the top of the loudspeaker and the deck meets manufacturer's minimum specifications.

3.5.3 Ensure that loudspeakers are suspended in a level manner.

3.5.4 Ensure that loudspeakers are not obstructed as much as possible.

3.5.5 Ensure cables are properly supported in the ceiling.

3.6 **Network Configuration and Adjustment**

Follow manufacturer's procedure for system setup and commissioning as found in the system's user manual.

3.7 **Cleaning**

3.7.1 Ensure that empty packaging is removed. Recycle as much as possible.

3.7.2 Ensure that product is clean and presentable where required.

3.8 **Demonstration and Training**

3.8.1 Demonstrate operational system to customer by walking the space.

3.8.2 Demonstrate functionality of the system to the customer or customer's representative.

3.8.3 Train customer employee to maintain system as required.

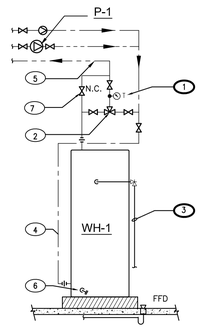
END OF SECTION

WH-1 HOT WATER HEATER 'A.O. SMITH'
MODEL No. DRE-52-6, 50 GAL.
HEATING INPUT: 6.0 KW
25 GAL/HR RECOVERY AT 100°F
APPROVED MANUFACTURER:
'A.O. SMITH', 'RHEEM-RUUD', 'LOCHINVAR'

P-1 RECIRCULATING HOT WATER PUMP
'ARMSTRONG' MODEL ASTRO 50B
ALL BRONZE BODY
0.5 L/S @3M HEAD, 120V, 1A
APPROVED MANUFACTURER:
'ARMSTRONG', 'BELL&GOSSET', ITT

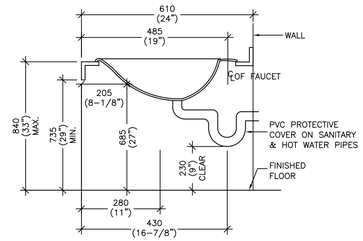
NOTES

1. HOT WATER TEMPERATURE GAUGE
2. THERMOSTATIC MIXING VALVE. 'WATTS' HI-LO MODEL#SH1432
3. T&P RELIEF LINE. PIPE TO FUNNEL FLOOR DRAIN.
4. COLD WATER SUPPLY LINE. FOR SIZE SEE PLUMBING LAYOUT
5. HOT WATER SUPPLY TO SPACE. FOR SIZE SEE PLUMBING LAYOUT
6. DRAIN VALVE C/W THREADED HOSE CONNECTOR.
7. BY-PASS VALVE N.C.



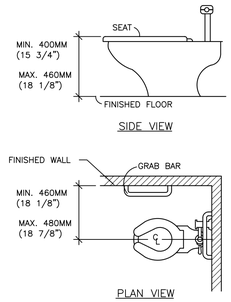
NOTE:
SUPPLY AND INSTALL THERMAL EXPANSION TANK A.O. SMITH 'PROMAX' IF WATER SYSTEM IS CLOSED LOOP SYSTEM.

1 M-3 WATER HEATER - PIPING DETAIL
N.T.S.

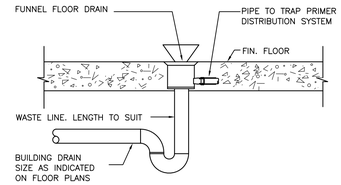


NOTES:

- PLUMBING CONTRACTOR TO CONFIRM THESE DIMENSIONS WITH LOCAL AUTHORITIES PRIOR TO INSTALLATION.
- PLUMBING CONTRACTOR TO INCORPORATE THESE DIMENSIONS DURING ROUGH-IN. COORDINATE WITH G.C.



2 M-3 DETAIL OF 'BARRIER FREE' PLUMBING FIXTURES
N.T.S.


FUNNEL FLOOR DRAIN
PIPE TO TRAP PRIMER DISTRIBUTION SYSTEM
FIN. FLOOR
WASTE LINE, LENGTH TO SUIT
BUILDING DRAIN SIZE AS INDICATED ON FLOOR PLANS

3 M-3 FLOOR DRAIN TYPICAL DETAIL
N.T.S.

CLIENT:
Region of Peel
Working for You
10 Peel Centre Drive
BRAMPTON

PROJECT:
MALTON PUBLIC HEALTH CLINIC
7205 Goreway Drive
Units B7&B8
MISSISSAUGA, Ontario

Project No. 2013-166

PNF ENGINEERING INC.
BUILDING SERVICES ENGINEERS
4-1290 EGLINTON AVE. EAST
MISSISSAUGA ONT. L4W 1K8
T. (905) 625-5322
F. (905) 625-0758

LICENSED PROFESSIONAL ENGINEER
NOV 20/13
D. PAVLOVIC
PROVINCE OF ONTARIO

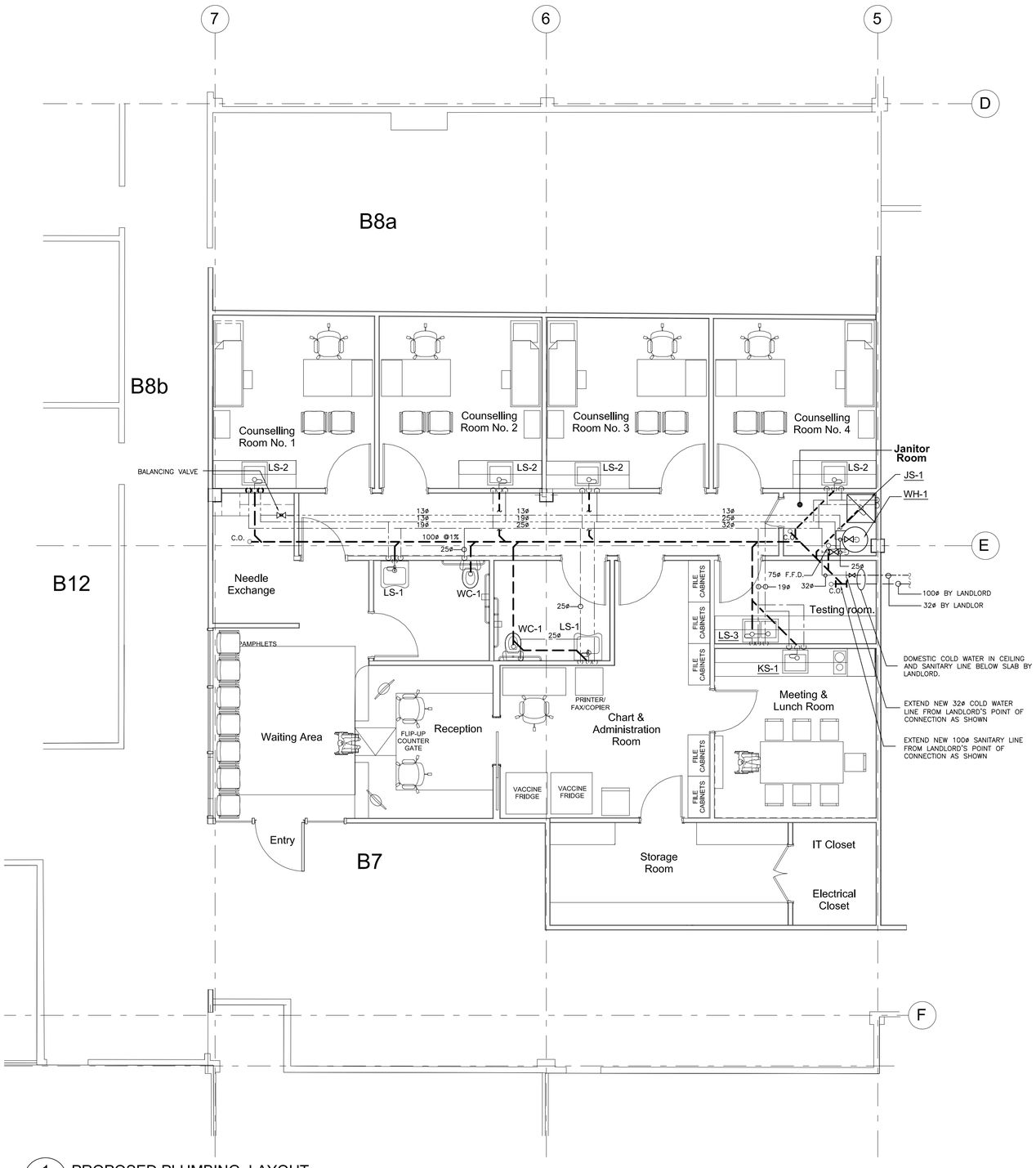
2	20NOV13	Issued for Tender
1	5NOV13	Issued for Building Permit
0	27SEP13	Issued for Co-ordination

REVISIONS

DRAWING
DETAILS

Job No.	13018
DRAWN BY:	D.R.
CHECKED:	D.P.
SCALE:	AS SHOWN

M-3
OF 3



1 / M-2 PROPOSED PLUMBING LAYOUT
SCALE 1:50

PLUMBING FIXTURES SCHEDULE

WC-1 TOILET – FLOOR MOUNTED EXPOSED FLUSH VALVE (BARRIER FREE DESIGN) AMERICAN STANDARD #2305.100 'MADERA ELONGATED 16-1/8" (410MM) HIGH' 'LOW CONSUMPTION' TOILET, FLOOR MOUNTED FOR FLUSH VALVE, VITREOUS CHINA, ELONGATED SYPHON JET FLUSH ACTION BOWL, FULLY GLAZED 2" (50MM) BALL PASS INTERNAL TRAPWAY, 10" X 12" (254MM X 304MM) LARGE WATER SURFACE, 1.3 GAL. (6L) FLUSH, 1-1/2" (38MM) TOP SPUD AND BOLT CAPS. PROVIDE FLOOR FLANGE, FLANGE BOLTS AND GASKET. SLOAN #111-YG-XL 'REGAL' FLUSH VALVE, C.P. LOW CONSUMPTION, FACTORY SET FLOW, QUIET ACTION DIAPHRAGM TYPE WITH NON HOLD OPEN FEATURE, VACUUM BREAKER AND EXTENDED SEAT BUMPER ON BACK-CHECK ANGLE STOP. CENTOCO #8200ST0 TOILET SEAT, ELONGATED HEAVY DUTY SOLID PLASTIC OPEN FRONT WITH COVER, REINFORCED STAINLESS STEEL CHECK HINGE, POSTS, WASHERS AND NUTS.

LS-1 WALL HUNG BASIN ELECTRONIC FAUCET (BARRIER FREE DESIGN)
AMERICAN STANDARD MURRO WITH EVERCLEAN #0954.904EC/0059.020EC BASIN, SEALED OVERFLOW, 540MM X 520MM X (21-1/4" X 20-1/2" X 6-1/2") HIGH, VITREOUS CHINA, FOR CARRIER WITH CONCEALED ARMS, RECESSED SELF-DRAINING FAUCET LEDGE, SEMI-PEDESTAL P-TRAP COVER. SLOAN OPTIMA #ETF-600-VPB-BDT ELECTRONIC FAUCET, 4" (102MM) CENTERSET, CHROME FINISH CAST BRASS CONSTRUCTION, 1.9LPM (0.5 GPM) AERATOR SPRAY OUTLET, INFRARED SENSOR WITH SCREW ADJUSTABLE RANGE, UNDERCOUNTER FILTERED SOLENOID VALVE WITH SERVICEABLE STRAINER FILTER, MODULE CONTROL ASSEMBLY WITH SPLASHPROOF JUNCTION BOX AND MOUNTING KIT, 24VAC 50/60HZ, VANDAL PROOF BOX, 12" (305MM) SQ. RECESSED METAL BOX WITH 13"(330MM) SQ. V. P. S. S FACE, LOCATED IN WALL UNDER BASIN. FLEXIBLE COPPER SUPPLY, POINT OF USE THERMOSTATIC WATER MIXING VALVE, NICKEL PLATED BRONZE BODY, TEMPERATURE ADJUSTING SPINDLE, 10 MM (3/8") INLET AND OUTLET FNPT CONNECTION, INTEGRAL CHECKS, OFFER TEMPERATURE RANGE BETWEEN 95 C (203 F) AND 46 C (114.8 F). SET VALVE TEMPERATURE AT 46 C (114.8 F).SLOAN #EL-154, BOX MOUNT HARD WIRED TRANSFORMER 120VA / 24VA 50A. MCGUIRE #PRODRAINC OPEN GRID DRAINCHROME PLATED CAST BRASS ONE PIECE TOP, 1.5MM (1/16") THICK TUBULAR 32MM (1-1/4") TAILPIECE, LESS OVERFLOW HOLES.MCGUIRE #8872C P-TRAREAVY CAST BRASS ADJUSTABLE BODY, WITH SLIP NUT, 32MM (1-1/4") SIZE, SHALLOW WALL FLANGE AND SEAMLESS TUBULAR WALL BEND. WATTS #TCA-411, BASIN CARRIER MOUNTED ON CONCRETE FLOOR, WITH EPOXY COATED CAST IRON CONCEALED ARMS WITH SLIDING ADJUSTABLE ARM BRACKETS, HEAVY DUTY ONE PIECE CONSTRUCTION STEEL PIPE LEGS WELDED TO BLOCK BASE FEET SUPPORT. MINIMUM SPACE REQUIRED: FOR ONE UNIT: 102MM (4") FOR TWO TO SIX UNITS IN A ROW: 152MM (6") FINISHED METAL STUD WALL TO BACK OF PIPE SPACE.

LS-2 COUNTERTOP MOUNT SINK – TWO HANDLE – MANUAL FAUCET FRANKE COMMERCIAL #LBS1306-1/2 SINGLE BOWL COUNTERTOP MOUNT SINK, 2 HOLES, 4" (102MM) CENTER, 392MM (15-7/16") X 384MM (15-1/8") X 152MM (6") DEEP, COUNTER MOUNTED, BACKLEDGE, MANUFACTURED FROM 18-10 TYPE 302 20 GAUGE (0.9MM) STAINLESS STEEL, SATIN FINISH RIM AND BOWL, MOUNTING KIT, FULLY UNDERCOATED TO REDUCE CONDENSATION AND RESONANCE, FACTORY APPLIED RIM SEAL, 3-1/2" (89MM) CRUMB CUP WASTE ASSEMBLY WITH 1-1/2" (38 MM) TAILPIECE. CHICAGO FAUCETS #895-ABCP-317VP-XK-GN2FC TWO HANDLE MANUAL FAUCET, 4" (102MM) CENTERSET, LEAD FREE SOLID BRASS BODY CONSTRUCTION, CERAMIC 1/4 TURN CARTRIDGE, 137MM (5-3/8") RIGID/SWING GOOSENECK SPOUT, 6.0LPM (1.6 GPM) MAX. FLOW PRESSURE COMPENSATING LAMINAR (NON-AERATING) OUTLET, PLAIN SPOUT END. METAL RED AND BLUE INDEX BUTTONS 102MM (4") LONG WRIST BLADE HANDLE WITH VANDAL RESISTANT SCREW.SUPPLY , PROVIDE FAUCET SUPPLIES CHROME FINISH ALL METAL CONSTRUCTION, LIGHT DUTY RESIDENTIAL ANGLE STOP, ESCUTCHEONS AND FLEXIBLE METAL RISERS.PROVIDE P-TRAP ADJUSTABLE ALL METAL CONSTRUCTION, 38MM (1-1/2") SIZE, AND ESCUTCHEON.

JS-1 SERVICE / MOP SINK – TWO HANDLE – MANUAL FAUCET STERN WILLIAMS #MTB-2424 SQUARE SERVICE / MOP SINK, 610MM (24") X 610MM (24") X 254MM (10") DEEP, FLOOR MOUNTED, TERRAZZO COMPOSED OF PEARL GRAY MARBLE CHIPS AND PORTLAND CEMENT GROUND SMOOTH, SEALED TO RESIST STAIN, CAST BRASS DRAIN WITH STAINLESS STEEL STRAINER, 3"(75MM) OUTLET.CHICAGO FAUCETS #305VB-XK-369VP WALL MOUNTED TWO HANDLE MANUAL FAUCET, 8" (203MM) CENTERSET, SOLID BRASS EXPOSED BODY CONSTRUCTION, CERAMIC 1/4 TURN CARTRIDGE, UNRESTRICTED HOSE END OUTLET, NONENMM (") FROM WALL TO OUTLET REACH, WITH BODY-MOUNTED VACUUM BREAKER, METAL RED AND BLUE INDEX BUTTONS 60MM (2-3/8") LONG LEVER HANDLE WITH VANDAL RESISTANT SCREW. STERN WILLIAMS V-7BUMPER GUARD EXTRUDED VINYL. STERN WILLIAMS T-35 HOSE AND WALL HOOK HOSE 36" (914MM) LONG WITH 3/4" (19MM) CHROME COUPLING, STAINLESS STEEL WALL BRACKET. STERN WILLIAMS T-40 MOP HANGER STAINLESS STEEL #4 FINISH, 24" (610MM) LONG WITH 3 RUBBER SPRING LOADED CLIPS. STERN WILLIAMS BP BACK SPLASH PANEL20 GAUGE TYPE 304 STAINLESS STEEL. STERN WILLIAMS TC-3 GASKETS" (76MM) FOR XHCI, PLASTIC AND STEEL PIPE. PROVIDE P-TRAP SAME MATERIAL AS THE CONNECTING PIPE DRAIN.

KS-1 COUNTERTOP MOUNT SINK – TWO HANDLE – MANUAL FAUCET FRANKE COMMERCIAL #LBS6807-1/3 SINGLE BOWL COUNTERTOP MOUNT SINK 3 HOLES, 8" (203MM) CENTER, 521MM (20-1/2") X 508MM (20") X 178MM (7") DEEP, COUNTER MOUNTED, BACKLEDGE, TYPE 302, 20 GAUGE (0.9MM) STAINLESS STEEL, SATIN FINISH RIM AND BOWL, MOUNTING KIT, FULLY UNDERCOATED TO REDUCE CONDENSATION AND RESONANCE, FACTORY APPLIED RIM SEAL, 3-1/2" (89MM) CRUMB CUP WASTE ASSEMBLY WITH 1-1/2" (38 MM) TAILPIECE.CHICAGO FAUCETS #1100-ABCP-369VP-XK-GN2A-E3VP TWO HANDLE MANUAL FAUCET, 8" (203MM) CENTERSET, LEAD FREE SOLID BRASS BODY CONSTRUCTION, CERAMIC 1/4 TURN CARTRIDGE, 133MM (5-1/4") RIGID/SWING GOOSENECK SPOUT, WITH VANDAL RESISTANT 8.3LPM (2.2 GPM), AERATOR OUTLET, METAL RED AND BLUE INDEX BUTTONS 60MM (2-3/8") LONG LEVER HANDLE WITH VANDAL RESISTANT SCREW.SUPPLY , PROVIDE FAUCET SUPPLIES CHROME FINISH ALL METAL CONSTRUCTION, LIGHT DUTY RESIDENTIAL ANGLE STOP, ESCUTCHEONS AND FLEXIBLE METAL RISERS. PROVIDE P-TRAP ADJUSTABLE ALL METAL CONSTRUCTION, 38MM (1-1/2") SIZE, AND ESCUTCHEON.

LS-3 COUNTERTOP MOUNT SINK – TWO HANDLE – MANUAL FAUCET FRANKE COMMERCIAL #LBD6408-1/3 DOUBLE BOWL COUNTERTOP MOUNT SINK 3 HOLES, 8" (203MM) CENTER, 521MM (20-1/2") X 794MM (31-1/4") X 203MM (8") DEEP, SPILLWAY, COUNTER MOUNTED, BACKLEDGE, MANUFACTURED FROM 18-10 TYPE 302 20 GAUGE (0.9MM) STAINLESS STEEL, SATIN FINISH RIM AND BOWL, MOUNTING KIT, FULLY UNDERCOATED TO REDUCE CONDENSATION AND RESONANCE, FACTORY APPLIED RIM SEAL, 3-1/2" (89MM) CRUMB CUP WASTE ASSEMBLY WITH 1-1/2" (38 MM) TAILPIECE. CHICAGO FAUCETS #786-ABCP-GN8FC-317VP-XK TWO HANDLE MANUAL FAUCET 8" (203MM) CENTERSET, LEAD FREE SOLID BRASS CONSTRUCTION WITH ONE PIECE CONCEALED ROUGH BODY, CERAMIC 1/4 TURN CARTRIDGE, 203MM (8") RIGID/SWING GOOSENECK SPOUT, 6.0LPM (1.6 GPM). METAL RED AND BLUE INDEX BUTTONS 102MM (4") LONG WRIST BLADE HANDLE WITH VANDAL RESISTANT SCREW.SUPPLY , PROVIDE FAUCET SUPPLIES CHROME FINISH ALL METAL CONSTRUCTION, LIGHT DUTY RESIDENTIAL ANGLE STOP, ESCUTCHEONS AND FLEXIBLE METAL RISERS.PROVIDE P-TRAP ADJUSTABLE ALL METAL CONSTRUCTION, 38MM (1-1/2") SIZE, AND ESCUTCHEON.

CLEANOUTS/ ACCESS COVERS – FLOOR CLEANOUT – ADJUSTABLE CLEANOUT WATTS #CO-200 -NH-34G-R-1FLOOR CLEANOUT, EPOXY COATED CAST IRON BODY, NO HUB , ABS PLUG WITH NEOPRENE GASKET, 5" (127MM) DIAMETER NICKEL BRONZE COVER.

FLOOR DRAINS – FINISHED AREA – ADJUSTABLE STRAINER.WATTS #FD-100-C -NH-A5-1 FLOOR DRAIN, EPOXY COATED CAST IRON BODY, ANCHOR FLANGE, REVERSIBLE CLAMPING COLLAR WITH PRIMARY AND SECONDARY WEEPHOLES, NO HUB , 5" (127MM) DIAMETER, NICKEL BRONZE STRAINER.

CLIENT:
Region of Peel
Working for You
10 Peel Centre Drive
BRAMPTON

PROJECT:
MALTON PUBLIC HEALTH CLINIC
7205 Goreway Drive
Units B7&B8b
MISSISSAUGA, Ontario

Project No. 2013-166

PNF ENGINEERING INC.
BUILDING SERVICES ENGINEERS
4-1290 EGLINTON AVE. EAST
MISSISSAUGA ONT. L4W 1K8
T. (905) 625-5322
F. (905) 625-0758

LICENSED PROFESSIONAL ENGINEER
NOV 20/13
D. PAVLOVIC
PROVINCE OF ONTARIO

2	20NOV13	Issued for Tender
1	5NOV13	Issued for Building Permit
0	27SEP13	Issued for Co-ordination

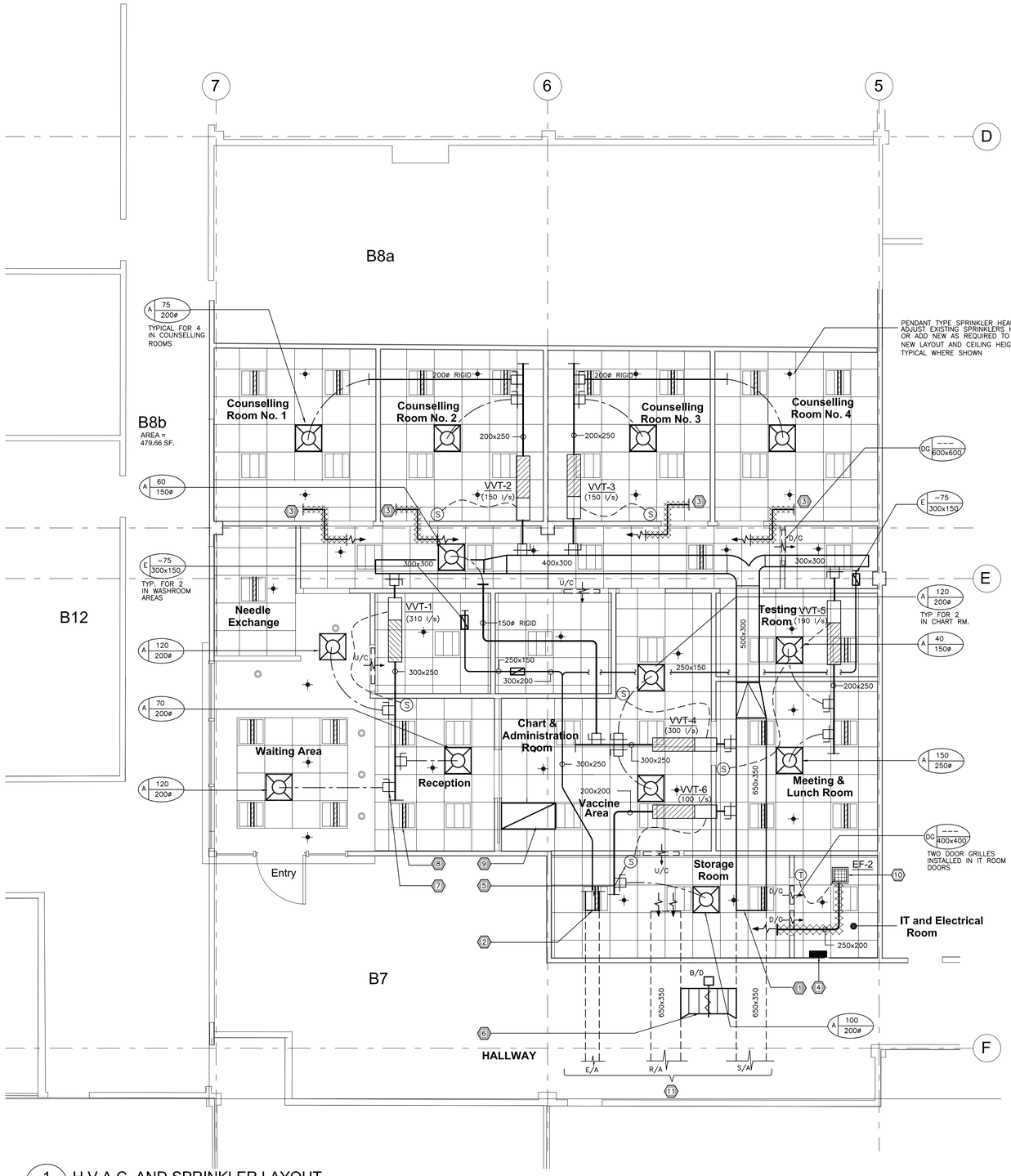
REVISIONS

DRAWING
PLUMBING LAYOUT

Job No.	13018
DRAWN BY:	D.R.
CHECKED:	D.P.
SCALE:	AS SHOWN

N PROJECT NORTH

M-2
OF 3



1 / M-1 H.V.A.C. AND SPRINKLER LAYOUT
SCALE 1:50

DRAWING NOTES

1. EXTEND S/A DUCT FROM LANDLORD POINT OF CONNECTION AS SHOWN.
2. EXTEND E/A DUCT FROM LANDLORD POINT OF CONNECTION AS SHOWN.
3. 300x150 AIR TRANSFER DUCT ABOVE T-BAR ACOUSTICALLY LINED. TYPICAL WHERE SHOWN
4. PROPOSED LOCATION OF A/C UNIT CONTROL PANEL
5. ZONE TEMPERATURE SENSOR. TYPICAL WHERE SHOWN
6. 550x300 ELECTRONIC BY-PASS DAMPER WITH INTEGRATED STATIC PRESSURE CONTROL AND BY-PASS DUCT, INSTALLED AND WIRED BY TENANT CONTRACTOR. INSTALL DAMPER IN CEILING OF HALLWAY.
7. VOLUME DAMPER. TYPICAL WHERE SHOWN
8. LIGHTING FIXTURE WITH CENTER RETURN AIR SLOT. TYPICAL WHERE SHOWN
9. 1200x600 EGG CRATE GRILLE ABOVE REFRIGERATORS IN VACCINE AREA.
10. HEAT REMOVAL FAN IN IT ROOM CONTROLLED WITH REVERSE ACTING THERMOSTAT. TERMINATE DUCT IN CEILING AREA. THERMALLY INSULATE DUCT FOR ENTIRE LENGTH.
11. S/A, R/A AND E/A DUCTS TO ROOF TOP A/C UNIT AND EXHAUST FAN ON ROOF BY LANLORD, FOR CONTINUATION SEE LANDLORD'S BASE BUILDING DRAWINGS. TENANT CONTRACTOR SHALL COORDINATE DUCTS TERMINATION POINTS WITH LANDLORD TO ACCOMMODATE SPACE FOR BYPASS DAMPER. TENANT CONTRACTOR TO INSTALL TEMPORARY AIR FILTER TO A/C UNIT DURING CONSTRUCTION AND REPLACE THEM WITH REGULAR AIR FILTERS UPON COMPLETION OF CONSTRUCTION.

NOTE:

1. ALL SUPPLY AIR DUCTWORK SHALL BE THERMALLY INSULATED
2. NATURAL GAS ACCOUNT TO BE TRANSFERRED TO TENANT ACCOUNT AT TIME OF LEASE POSSESSION.

H.V.A.C. LEGEND

SYMBOL	DESCRIPTION
	DOUBLE OR SINGLE LINE DUCTWORK
	SUPPLY AIR DUCT UP
	SUPPLY AIR DUCT DOWN
	RETURN/EXHAUST AIR DUCT UP
	RETURN/EXHAUST AIR DUCT DOWN.
	ROUND DUCT UP
	ROUND DUCT DOWN
	ACOUSTICALLY LINED DUCTWORK
	EXISTING DUCTWORK TO BE REMOVED
F/C	FLEXIBLE DUCT CONNECTION
	FLEXIBLE DUCT
U/C	UNDERCUT DOOR 75mm
	VOLUME DAMPER
B/D	BYPASS DAMPER
F/D	FIRE DAMPER
F.S/D	FIRE/SMOKE DAMPER
T	THERMOSTAT
T G	THERMOSTAT WITH COVER GOURD
S	TEMPERATURE SENSOR
TYPE FLOW (l/s) SIZE (mm)	DIFFUSER SYMBOL
	TURNING VANES
	VOLUME EXTRACTOR
S/A	SUPPLY AIR
R/A	RETURN AIR
G	GAS
A.F.F.	ABOVE FINISH FLOOR
C/W	COMPLETE WITH
W/	WITH
EX.	EXISTING
F.C.	FLEXIBLE CONNECTION

VVT BOX SCHEDULE

REFERENCE	MANUFACTURER AND MODEL No.	SIZE (MM)	DESIGN AIR FLOW (L/S)	MIN. AIR FLOW (L/S)	REMARKS
VVT-1	'ZONNEX SYSTEMS' MODEL 'GEN II'	300ø	310	100	COMPLETED WITH 900 mm ATTENUATOR SECTION
VVT-2	"	250ø	150	50	" "
VVT-3	"	250ø	150	50	" "
VVT-4	"	300ø	300	100	" "
VVT-5	"	250ø	190	60	" "
VVT-6	"	200ø	100	30	" "

NOTES:

1. ROOF TOP A/C UNIT 'LENNOX' MODEL #KGA 072 S4BH1Y, SUPPLIED AND INSTALLED BY LANDLORD. VVT ZONING SYSTEM SUPPLIED AND INSTALLED BY TENANT CONTRACTOR. ALL VVT CONTROLS SYSTEM SHALL BE COMPATIBLE WITH LANDLORDS A/C UNIT. FINAL COMMISSIONING AND CONNECTION OF CONTROLS TO A/C UNIT, UPGRADE OF CONTROL BOARD IF REQUIRED BY TENANT CONTRACTOR.
2. ANY ADJUSTMENTS TO PULLEYS AND/OR UPGRADE BLOWER MOTOR AND ELECTRICAL FEEDER FOR A/C UNIT TO ACHIEVE DESIGNED AIR FLOW BY TENANT CONTRACTOR.

DIFFUSER, GRILLE AND REGISTER SCHEDULE

TYPE — AIR VOLUME (l/s) / SIZE (mm)

TYPE	MODEL NO. 'NAILOR'	DESCRIPTION OR APPLICATION	VOLUME CONTROL DAMPER	REMARKS
'A'	RNSA-1-L	SUPPLY AIR	NO	
'B'	RNSA-1-S	SUPPLY AIR	NO	
'C'	61DV-0-SA	SUPPLY AIR	NO	
'D'	51EC-A	RETURN AIR GRILLE	NO	
'E'	51EC-0-S	EXHAUST AIR	YES	
'DG'	51DGD	DOOR GRILLE	NO	

APPROVED MANUFACTURERS: NAILOR INDUSTRIES, E.H. PRICE, TITUS
*FINISH AS SELECTED BY ARCHITECT/INTERIOR DESIGNER

EXHAUST FAN SCHEDULE

REFERENCE	AREA SERVED	MODEL 'PENN'	VOLUME L/S (CFM)	S.P. IN W.C.	H.P.	REMARKS
EF-1	WASHROOMS/JANITOR	DX-11	225 (450)	0.375	1/4	ROOF MOUNTED (SEE BASE BUILDING DRAWINGS)
EF-2	IT ROOM	Z10	200 (400)	0.375		CEILING MTD. WITH GRILLE, CONTROLLED WITH REVERSE ACTING T'STAT

APPROVED MANUFACTURERS: 'PENN', 'CARNES', 'DELHI'

CLIENT:

Region of Peel
Working for You

10 Peel Centre Drive
BRAMPTON

PROJECT:

MALTON PUBLIC HEALTH CLINIC
7205 Goreway Drive
Units B7&B8b
MISSISSAUGA, Ontario

Project No. 2013-166

PNF ENGINEERING INC.
BUILDING SERVICES ENGINEERS
4-1290 EGLINTON AVE. EAST
MISSISSAUGA ONT. L4W 1K8
T. (905) 625-5322
F. (905) 625-0758

LICENSED PROFESSIONAL ENGINEER
DEC 6/13
D. PAVLOVIC
PROVINCE OF ONTARIO

3	6DEC13	Revised to sulte base building changes
2	20NOV13	Issued for Tender
1	5NOV13	Issued for Building Permit
0	27SEP13	Issued for Co-ordination

REVISIONS

DRAWING
H.V.A.C. AND SPRINKLER LAYOUT

Job No.	13018
DRAWN BY:	D.R.
CHECKED:	D.P.
SCALE:	AS SHOWN

N PROJECT NORTH

M-1
OF 3

PANEL 'DP'

■ 120/208V/3 PH/ 4 WIRE
■ SURFACE MOUNTED
■ INSULATED GROUND BUS

200A, C/W 200A MAIN BREAKER, SPRINKLER PROOF

DESCRIPTION	LOAD	BKR	CCT		CCT	BKR	LOAD	DESCRIPTION
** EMERGENCY BATT. PACK	800	15	1	A	2	20	600	WASHROOM EXHAUSTS
LIGHTS JAN./MEET./STORG.	385	15	3	B	4	15	700	LIGHTING
COUNS. RM. 1 IG	500	15	5	C	6	15	560	LIGHTING COUNS. ROOMS
COUNS. RM. 2 IG	500	15	7	A	8	15	500	COUNS. RM. 3 IG
COUNS. RM. 4 IG	500	15	9	B	10	15	500	COUNS. RM. 1 GFI
COUNS. RM. 2 GFI	500	15	11	C	12	15	500	COUNS. RM. 3 GFI
COUNS. RM. 4 GFI	500	15	13	A	14	15	500	HALLWAY/WAIT AREA RECEPT.
WASHROOMS GFI	500	15	15	B	16	15	500	ATM & TV RECEPT. IG
RECEPTION IG	500	15	17	C	18	15	500	RECEPTION IG
CHART & ADMIN IG	500	15	19	A	20	15	500	VACINE AREA RECEPT.
SENSAPHONE IG	250	15	21	B	22	15	1000	ELEC./STORG. RM. RECEPT.
LUNCH ROOM IG	500	15	23	C	24	15	500	FRIDGE RECEPT.
KITCHEN GFI	500	15	25	A	26	15	1000	MICROWAVE RECEPT.
TEST ROOM GFI	500	15	27	B	28	15	500	TEST ROOM GFI
WASHRM. DOOR OPEN./LOCK	800	15	29	C	30	15	600	DOOR OPENERS RECEPTION
CARD READERS	500	15	31	A	32	15	500	IT ROOM IG
IT ROOM IG	500	15	33	B	34	15	600	VVT BOXES
A/C UNIT (BY LADNLORD)			35	C	36	15	200	TOUCH LESS FAUCET
			37	A	38	30 / 3P	3800	PANEL 'DS'
			39	B	40			
WATER HEATER	6000	20 / 3P	41	C	42			
			43	A	44	30 / 3P	2250	COMMUNICATION PANEL
			45	B	46			
EXAM TABLE, COUNS. RM. 1	1200	15	47	C	48			
EXAM TABLE, COUNS. RM. 2	1200	15	49	A	50	15	100	BELL PATCH PANEL
EXAM TABLE, COUNS. RM. 3	1200	15	51	B	52	15	500	EXAM ROOM UTILITY RECEPT.
EXAM TABLE, COUNS. RM. 4	1200	15	53	C	54	15	500	EXAM ROOM UTILITY RECEPT.
SPARE		15	55	A	56	15	300	SOUND MASKING
SPARE		15	57	B	58	15		SPARE
SPARE		15	59	C	60			
			61	A	62			
			63	B	64			
			65	C	66			
			67	A	68			
			69	B	70			
			71	C	72			
			73	A	74			
			75	B	76			
			77	C	78			
			79	A	80			
			81	B	82			
			83	C	84			

** = INSTALL BREAKER LOCK-ON

PANEL 'DS'

■ 120/208V/3 PH
■ SURFACE MOUNTED
■ INSULATED GROUND BUS

125A, SPRINKLER PROOF

DESCRIPTION	LOAD	BKR	CCT		CCT	BKR	LOAD	DESCRIPTION
VACCINE FRIDGE	1200	15	1	A	2	15	140	** NIGHT LIGHT
VACCINE FRIDGE	1200	15	3	B	4	15	1200	FUTURE VACCINE FRIDGE
SPARE		15	5	C	6	15		SPARE
			7	A	8			
			9	B	10			
			11	C	12			

** = INSTALL BREAKER LOCK-ON

IT PANEL

■ 120/208V/3 PH/ 4 WIRE
■ SURFACE MOUNTED
■ INSULATED GROUND BUS

125A, SPRINKLER PROOF

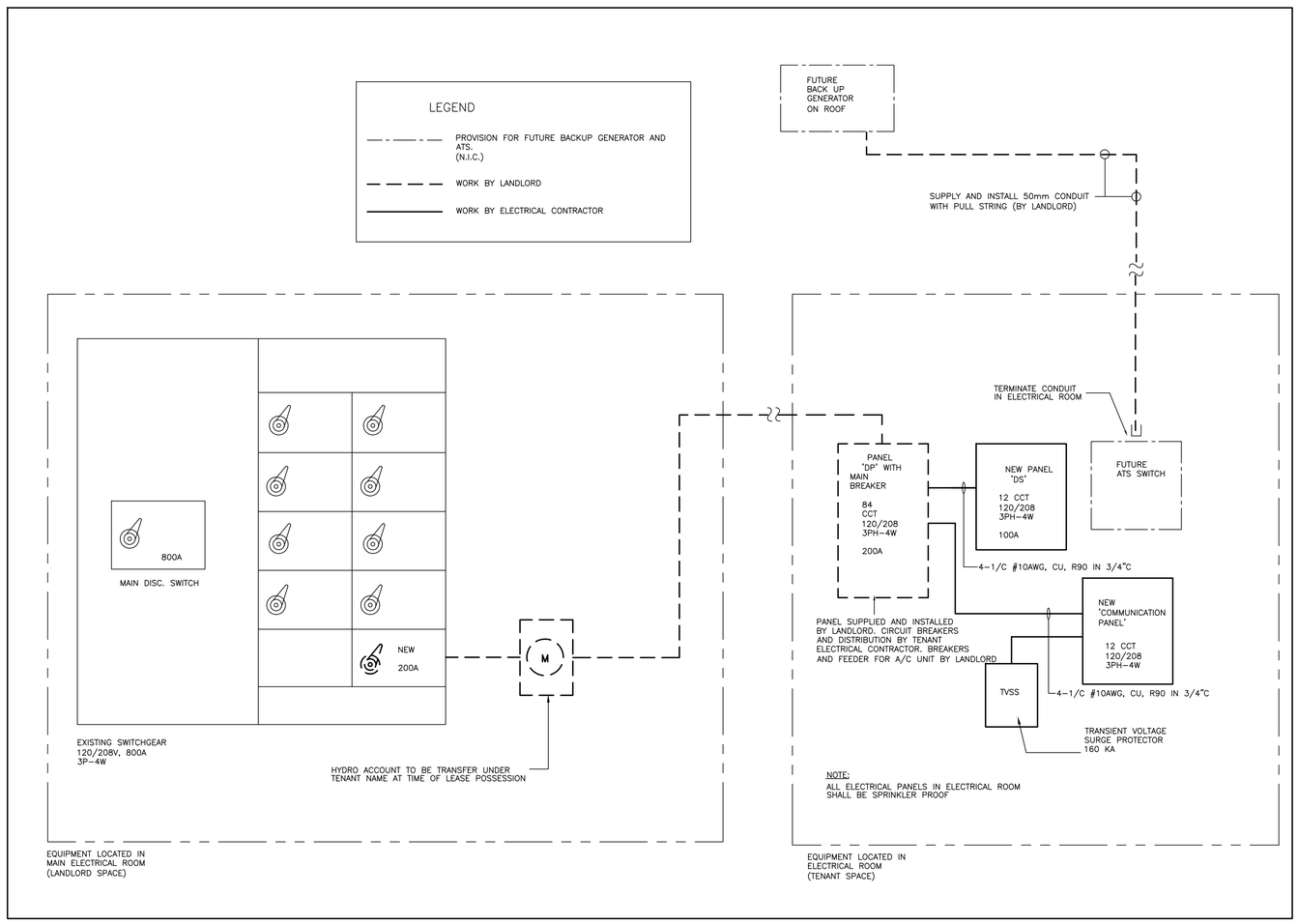
DESCRIPTION	LOAD	BKR	CCT		CCT	BKR	LOAD	DESCRIPTION
RECEPTACLE IG	500	20	1	A	2	20	500	RECEPTACLE IG
RECEPTACLE IG	500	20	3	B	4	20	1500	RECEPTACLE IG (UPS)
RECEPTACLE IG	500	20	5	C	6	15		SPARE
			7	A	8	15		SPARE
			9	B	10			
			11	C	12			

LEGEND

225A, C/W 200A MAIN BREAKER, SPRINKLER PROOF

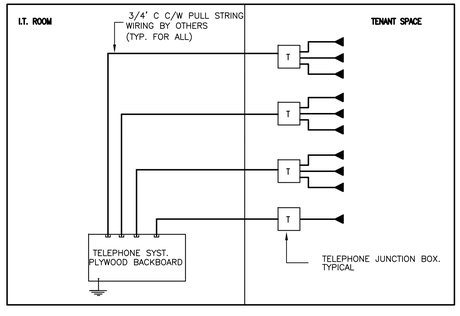
	CEILING OR WALL MOUNTED EXIT LIGHT
	LIGHTS ON NIGHT CIRCUIT
	COMBINATION EMERGENCY AND EXIT LIGHT BATTERY UNIT
	REMOTE EMERG. LIGHT WALL / CEILG. MTD.
$	SINGLE POLE TOGGLE SWITCH WITH ONE, TWO OR THREE GANG COVERPLATE
$2 $3 $4	SWITCHES AS ABOVE, NUMBER DENOTES 2, 3, OR 4 WAY.
$D	DIMMER SWITCH
$T/D	TIME DELAY SWITCH
	15A/125V DUPLEX U-GROUND RECEPTACLE
I.G.	15A/125V DUPLEX U-GROUND RECEPTACLE C/W INSULATED GROUNDING
	20A/125V DUPLEX RECEPT. GROUNDED
	15A/125V DUPLEX, SPLIT WIRED & GROUNDED
	SPECIAL RECEPTACLE & GROUNDED
	WALL MTD. VOICE/DATA OUTLET 19 mm (3/4") CONDUIT INTO CLG. SPACE
	WALL MTD. VOICE/DATA OUTLET WITH 19mm (3/4" CONDUIT TO TEL. SERVICE BOARD
	CEILING MTD. TV OUTLET
	ELECTRIC BASEBOARD HEATER C/W BUILT IN TSTAT
	120 VOLT DIRECT CONNECTION 1 PH
	208 VOLT DIRECT CONNECTION 1 PH
	208 VOLT DIRECT CONNECTION 3 PH
	600 VOLT DIRECT CONNECTION 3 PH
	FLUSH OR SURFACE MTD. LIGHTING PANEL
T	LOW VOLTAGE REVERSE ACTING THERMOSTAT
A.1	CIRCUIT #1 IN PANEL 'A'
	UNFUSED DISCONNECT SWITCH
	FUSED DISCONNECT SWITCH
	COMBINATION DISCONNECT/MOTOR STARTER
C	LIGHTING CONTACTOR
E	EMERGENCY PUSH BUTTON
B	PUSH BUTTON DOOR OPENER / PUSH BUTTON DOOR LOCK
S	TEMPERATURE SENSOR
J	JUNCTION BOX
	FIRE ALARM MANUAL PULL STATION
B	FIRE ALARM BELL

LOAD CALCULATION	
LIGHTING 2.5kW @ 100%	2.5kW
COMPUTERS STATIONS 2.1kW 2.1kW @ 100%	2.1kW
KITCHEN EQUIP. 3.8kW @ 100%	3.8kW
VACCINE FRIDGE 3.6kW @ 100%	3.6kW
EXAM. TABLE 6kW @ 75%	4.5kW
DOOR OPRTR. 1.0kW @ 100%	1.0kW
IT ROOM 2.2kW @ 100%	2.2kW
WATER HEATER 6.0kW @ 100%	6.0kW
MISC. & RCTP. 7.0kW @ 75%	5.3kW
A/C UNIT 16kW @100%	16kW
EXH. FAN & VVTs 2.0kw @100%	2.0kW
ESTIMATED DEMAND LOAD (208V-3PH-4W)	49.0kW


LEGEND
PROVISION FOR FUTURE BACKUP GENERATOR AND ATS. (N.I.C.)
WORK BY LANDLORD
WORK BY ELECTRICAL CONTRACTOR
FUTURE BACK UP GENERATOR ON ROOF
SUPPLY AND INSTALL 50mm CONDUIT WITH PULL STRING (BY LANDLORD)
TERMINATE CONDUIT IN ELECTRICAL ROOM
800A
MAIN DISC. SWITCH
NEW 200A
M
PANEL 'DP' WITH MAIN BREAKER
84 CCT 120/208 3PH-4W
200A
NEW PANEL 'DS'
12 CCT 120/208 3PH-4W
100A
FUTURE ATS SWITCH
4-1/C #10AWG, CU, R90 IN 3/4"C
PANEL SUPPLIED AND INSTALLED BY LANDLORD. CIRCUIT BREAKERS AND DISTRIBUTION BY TENANT ELECTRICAL CONTRACTOR. BREAKERS AND FEEDER FOR A/C UNIT BY LANDLORD
NEW 'COMMUNICATION PANEL'
12 CCT 120/208 3PH-4W
TVSS
4-1/C #10AWG, CU, R90 IN 3/4"C
TRANSIENT VOLTAGE SURGE PROTECTOR 160 KA
EXISTING SWITCHGEAR 120/208V, 800A 3P-4W
HYDRO ACCOUNT TO BE TRANSFER UNDER TENANT NAME AT TIME OF LEASE POSSESSION
NOTE:
ALL ELECTRICAL PANELS IN ELECTRICAL ROOM SHALL BE SPRINKLER PROOF
EQUIPMENT LOCATED IN MAIN ELECTRICAL ROOM (LANDLORD SPACE)
EQUIPMENT LOCATED IN ELECTRICAL ROOM (TENANT SPACE)

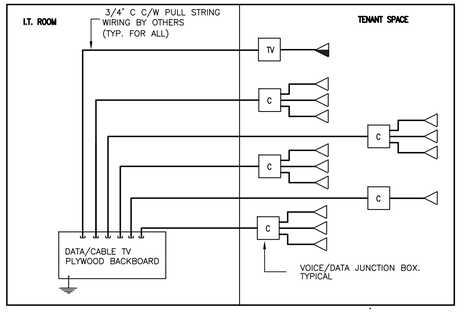
SINGLE LINE DIAGRAM

N.T.S.


I.T. ROOM
3/4" C C/W PULL STRING WIRING BY OTHERS (TYP. FOR ALL)
TENANT SPACE
T
TELEPHONE SYST. PLYWOOD BACKBOARD
TELEPHONE JUNCTION BOX. TYPICAL

TELEPHONE SYSTEM RISER DIAGRAM

N.T.S.



VOICE/DATA COMMUNICATION RISER DUIAGRAM

N.T.S.

CLIENT:

Region of Peel
Working for You

10 Peel Centre Drive
BRAMPTON

PROJECT:

MALTON PUBLIC HEALTH CLINIC

7205 Goreway Drive
Units B7A&B8
MISSISSAUGA, Ontario

Project No. 2013-166

PNF ENGINEERING INC.
BUILDING SERVICES ENGINEERS
4-1290 EGLINTON AVE. EAST
MISSISSAUGA ONT. L4W 1K8
T. (905) 625-5322
F. (905) 625-0758

LICENCED PROFESSIONAL ENGINEER
DEC 6/13
S.HADZIAVDIC
PROVINCE OF ONTARIO

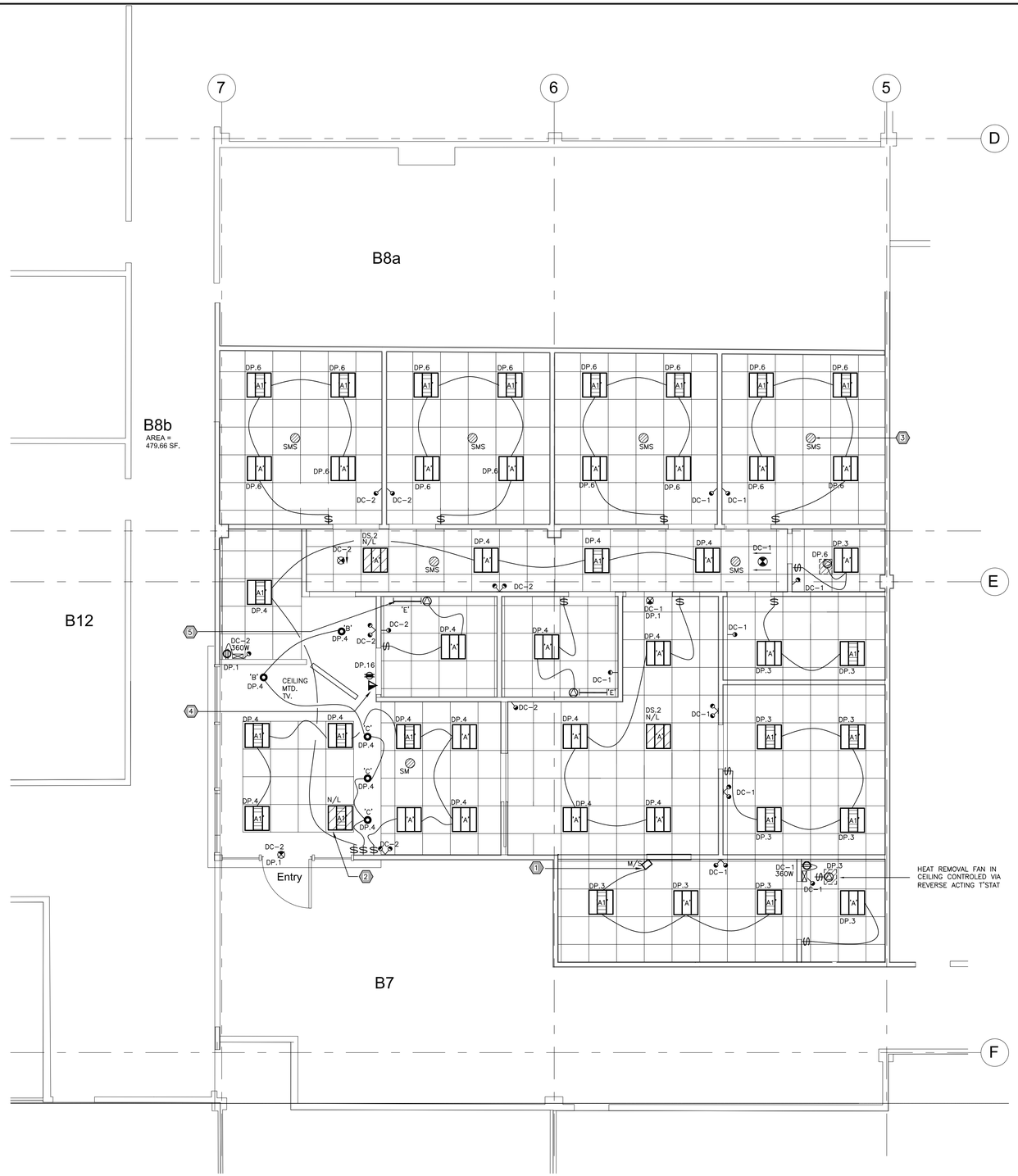
4	6DEC13	revised as per Landlord comments
3	20NOV13	Issued for Tender
2	5NOV13	Issued for building permit
1	08OCT13	Issued for client review
0	27SEP13	Issued for Co-ordination

REVISIONS

DRAWING: ELECTRICAL DISTRIBUTION AND DETAILS

Job No.	13018
DRAWN BY:	D.R.
CHECKED:	S.H.
SCALE:	AS SHOWN

E-3
OF 3



1 E-2 LIGHTING LAYOUT
SCALE 1:50

LUMINAIRE SCHEDULE

Label	Catalog Number	Description	Lamp	
'A'	2RT5 14T5 GEB115	VOLUMETRIC RECESSED LIGHTING FIXTURE.	TWO 14-WATT T-5 LINEAR FLUORESCENT, RATED 1350 LUMENS EACH AT 25C AMBIENT.	F14KT5/835 ALTO PHILIPS
'A1'	2RT5 CAS 14T5 GEB115 (WITH AIR SLOT)	VOLUMETRIC RECESSED LIGHTING FIXTURE.	TWO 14-WATT T-5 LINEAR FLUORESCENT, RATED 1350 LUMENS EACH AT 25C AMBIENT.	F14KT5/835 ALTO PHILIPS
'B'	CAT. LF8 1 32TRT F801AZ MVOLT	LITHONIA DOWNLIGHT FOR USE WITH 32W TRT LAMP	ONE TRT 32 WATT COMPACT FLUORESCENT LAMP RATED 2400 LUMENS	DITTO TYPE D
'C'	DLV DWN MR 16 4AC MVOLT	LITHONIA DOWNLIGHT FOR USE WITH MR16 LAMP	MRC16/IRC/NFL PHILIPS	MR16 60W
'D'	SL281-120	DAY BRIGHT UNDER COUNTER LIGHT SINGLE LAMP	T5 FLUORESCENT 33-1/2" LENGTH	T5 13W
'E'	WC120 GEBIS	WALL MOUNTED ABOVE MIRROR LIGHT	SINGLE 20 WATT T8 FLUORESCENT LAMP	T8

DRAWINGS NOTES

1. SUPPLY AND INSTALL NEW MOTION (OCCUPANCY) SENSOR IN T-BAR CEILING. SENSOR SHALL CONTROL STORAGE ROOM LIGHTING. 'WATTS STOPPER' CEILING SENSOR OR EQUAL.
2. CONNECT LIGHT TO SEPARATE LOCK-ON NIGHT LIGHT CIRCUIT BREAKER. (TYPICAL WHERE SHOWN)
3. SUPPLY AND INSTALL SOUND MASKING SPEAKER (SMS) ABOVE T-BAR CEILING WIRED TO SOUND MASKING GENERATOR LOCATED IN ELECTRICAL. TYPICAL FOR 7.
4. RECEPTACLE AND DATA OUTLETS FOR TV INSTALLED ABOVE DRYWALL CEILING. OUTLETS SHALL BE ACCESSIBLE FROM ADJACENT WASHROOM CEILING SPACE.
5. LIGHT FIXTURE 'E' ABOVE MIRROR. HEIGHT COORDINATE ON SITE. FIXTURE TO CENTERED TO VANITY MIRROR. TYPICAL FOR 2 IN WASHROOM AREAS

EMERGENCY LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION
	EMERGENCY LIGHTING REMOTE SINGLE HEAD CAT.NO. DR1130-WH-AK-12V 20W
	EMERGENCY LIGHTING REMOTE TWIN HEAD FIXTURE BY LUMACELL CAT.NO. DR2130-WH-AK-12V 20W
DC-1 20W DC-2 360W	EMERGENCY LIGHTING BATTERY UNIT BY LUMACELL, CAT.NO. RG12S 360-1DR 1130-WH-AK-20W
	EXIT SIGN BY LUMACELL CAT.NO. LMCEU-N-AK

CLIENT:

Region of Peel
Working for You

10 Peel Centre Drive
BRAMPTON

PROJECT:

MALTON PUBLIC HEALTH CLINIC

7205 Goreway Drive
Units B7&B8b
MISSISSAUGA, Ontario

Project No. 2013-166

PNF ENGINEERING INC.
BUILDING SERVICES ENGINEERS
4-1290 EGLINTON AVE. EAST T. (905) 625-5322
MISSISSAUGA ONT. L4W 1K8 F. (905) 625-0758

LICENSED PROFESSIONAL ENGINEER
NOV 20/13
S. HADZIAVDIC
PROVINCE OF ONTARIO

3	20NOV13	Issued for Tender
2	5NOV13	Issued for building permit
1	08OCT13	Issued for client review
0	27SEP13	Issued for Co-ordination

REVISIONS

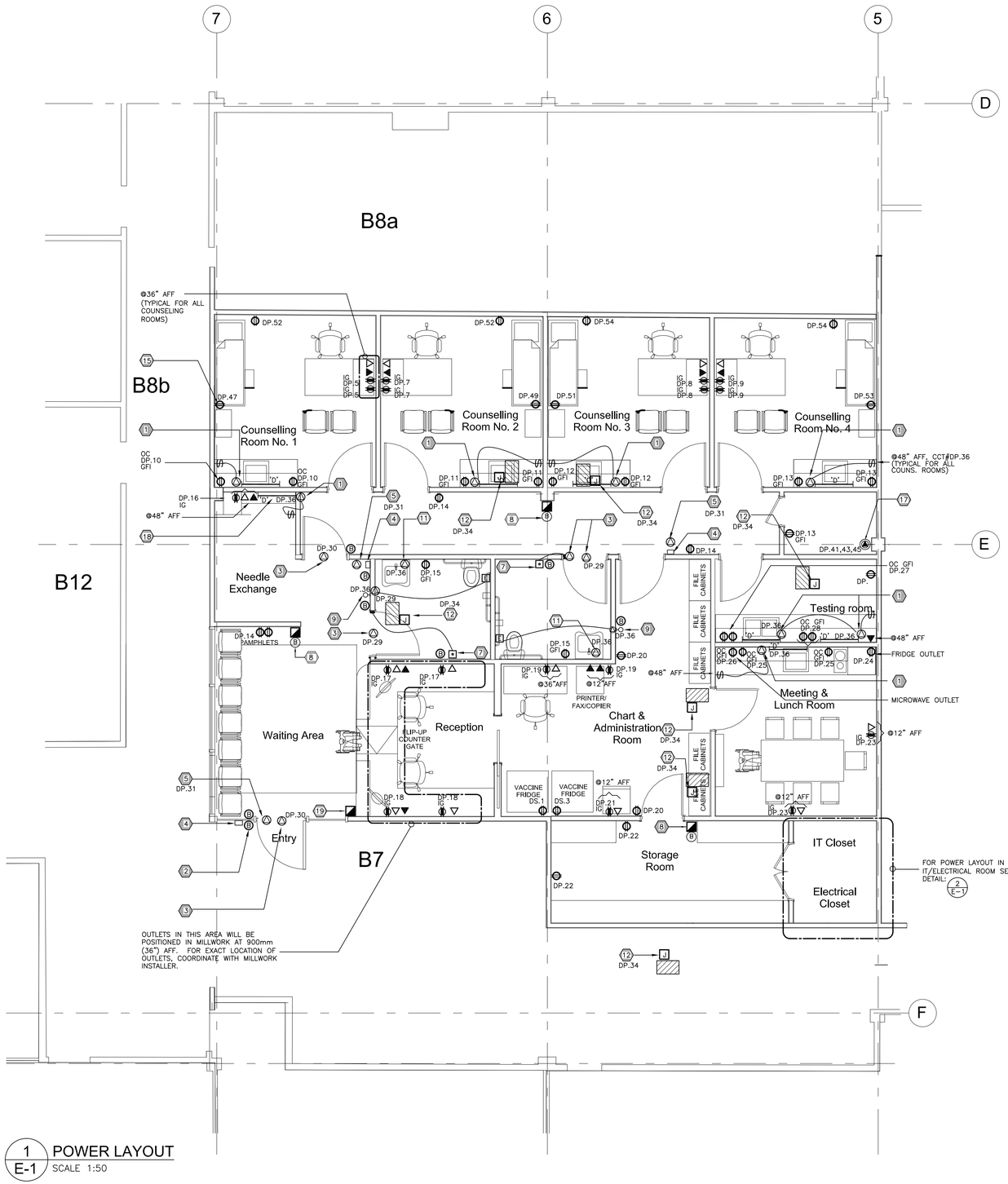
DRAWING

LIGHTING LAYOUT

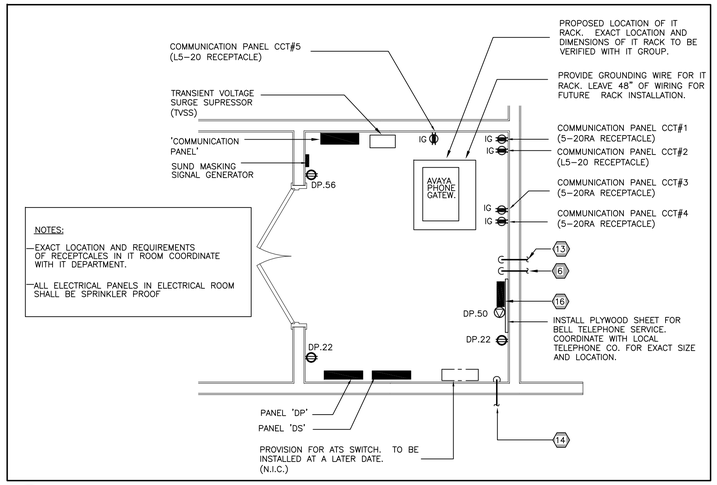
Job No.	13018
DRAWN BY:	D.R.
CHECKED:	S.H.
SCALE:	AS SHOWN

N PROJECT NORTH

E-2
OF 3



1 / E-1 POWER LAYOUT
SCALE 1:50


COMMUNICATION PANEL CCT#5 (L5-20 RECEPTACLE)
TRANSIENT VOLTAGE SURGE SUPRESSOR (TVSS)
'COMMUNICATION PANEL'
SUND MASKING SIGNAL GENERATOR
DP.56
AVAYA PHONE GATEW.
PROPOSED LOCATION OF IT RACK. EXACT LOCATION AND DIMENSIONS OF IT RACK TO BE VERIFIED WITH IT GROUP.
PROVIDE GROUNDING WIRE FOR IT RACK. LEAVE 48" OF WIRING FOR FUTURE RACK INSTALLATION.
COMMUNICATION PANEL CCT#1 (5-20RA RECEPTACLE)
COMMUNICATION PANEL CCT#2 (L5-20 RECEPTACLE)
COMMUNICATION PANEL CCT#3 (5-20RA RECEPTACLE)
COMMUNICATION PANEL CCT#4 (5-20RA RECEPTACLE)
NOTES:
EXACT LOCATION AND REQUIREMENTS OF RECEPTCALES IN IT ROOM COORDINATE WITH IT DEPARTMENT.
ALL ELECTRICAL PANELS IN ELECTRICAL ROOM SHALL BE SPRINKLER PROOF
DP.50
DP.22
INSTALL PLYWOOD SHEET FOR BELL TELEPHONE SERVICE. COORDINATE WITH LOCAL TELEPHONE CO. FOR EXACT SIZE AND LOCATION.
PANEL 'DP'
PANEL 'DS'
PROVISION FOR ATS SWITCH. TO BE INSTALLED AT A LATER DATE. (N.I.C.)

2 / E-1 IT/ELECTRICAL ROOM POWER LAYOUT
SCALE 1:25

ABBREVIATIONS:

AFF	ABOVE FINISHED FLOOR
OC	OUTLET TO BE INSTALLED ABOVE COUNTER @48" (1.2m) AFF.
N.I.C.	NOT IN THIS CONTRACT

GENERAL NOTES

1. PROVIDE INSULATED GREEN COLORED GROUNDING WIRE TO EACH RECEPTACLE DEVICE THROUGHOUT THE AREA. EMT CONDUIT SHALL NOT BE CONSIDERED A MEANS OF GROUNDING.
2. ALL RECEPTACLES IN EXAM ROOMS SHALL BE HOSPITAL GRADES.
3. PROVIDE WHITE POLYCARBONATE COVERLETS THROUGHOUT THE SPACE. PROVIDE STAINLESS STEEL COVER PLATE IN ALL EXAM ROOMS AND TESTING ROOM.

DRAWINGS NOTES

1. DIRECT CONNECTION FOR UNDER COUNTER TASK LIGHTING. LIGHTING SHALL BE CENTERED TO THE CABINET. INSTALL SEPARATE LIGHTING SWITCH @48" (1.2m) AFF.
2. PUSH BUTTON FOR DOOR OPENER FOR HANDICAP USE, INSTALLED @42" (1.05m) AFF. (TYPICAL WHERE SHOWN)
3. POWER CONNECTION FOR AUTOMATIC DOOR OPENER AND TO ACTIVATE ELECTRIC STRIKE. 120V/1PH/60Hz.
4. FUTURE CARD READER INTERLOCKED WITH ELECTRIC STRIKE AND PUSH BUTTON. INSTALLED AND WIRED BY SECURITY CONTRACTOR.
5. POWER CONNECTION FOR CARD READER. 120V/1PH/60, TERMINATED IN CEILING J.B. INSTALL 19mm EMPTY CONDUIT C/W PULL STRING. EXACT LOCATION COORDINATE WITH SECURITY CONTRACTOR. WIRING BY SECURITY CONTRACTOR.
6. PROVIDE 50mm EMPTY EMT CONDUIT FOR BELL TELEPHONE SERVICE C/W PULLSTRING AND PULLBOX AS REQUIRED. CONDUIT SHALL TERMINATE AT THE MAIN TELEPHONE SERVICE ROOM. EXACT LOCATION OF CONDUIT TERMINATION AS WELL AS CONDUIT ROUTING TO BE DETERMINED ON SITE.
7. 'PUSH TO LOCK' BUTTON TO ACTIVATE DOOR LOCK, C/W FAIL SAFE ELECTRIC STRIKE AND RELAY. ELECTRICAL CONTRACTOR TO PROVIDE POWER SUPPLY.
8. SUPPLY AND INSTALL THREE (3) – 6" FIRE ALARM BELLS. WORK TO BE PERFORMED BY LANDLORD CONTRACTOR AT TENANT EXPENSE.
9. CALL FOR ASSISTANCE KIT C/W PUSH BUTTON AND STROBE LIGHT BY 'EDWARDS' OR EQUAL. WHEN SYSTEM IS ACTIVATED STROBE LIGHT IS 'ON' AND WASHROOM DOOR SHALL BE UNLOCKED.
10. SPARE
11. PROVIDE POWER CONNECTION FOR TOUCHLESS FAUCET IN WC UNDER LAVATORY FOR LOCATION OF JUNCTION BOX AND ASSOCIATED TRANSFORMER COORDINATE WITH PLUMBING CONTRACTOR.
12. PROVIDE JUNCTION BOX IN CEILING FOR VVT BOX. FINAL CONNECTION TO VVT BOX BY MECHANICAL CONTRACTOR EXACT LOCATION COORDINATE ON SITE.
13. PROVIDE 50mm EMPTY EMT CONDUIT FOR FIBER OPTIC CABLE, C/W PULLSTRING AND PULL BOXES AS REQUIRED. CONDUIT SHALL TERMINATE AT THE POLICE STATION ON GROUND FLOOR. EXACT LOCATION OF CONDUIT TERMINATION POINT AS WELL AS CONDUIT ROUTING TO BE DETERMINED ON SITE.
14. PROVIDE 50mm EMPTY EMT CONDUIT FOR FUTURE GENERATOR POWER CONNECTION CABLES, C/W PULLSTRING AND PULL BOXES AS REQUIRED. CONDUIT SHALL TERMINATE ON THE ROOF. EXACT LOCATION OF CONDUIT TERMINATION POINT AS WELL AS CONDUIT ROUTING TO BE DETERMINED ON SITE. CAP OFF CONDUIT TERMINATION POINT.
15. WALL RECEPTACLES SHALL BE MOUNTED AT A HEIGHT OF 12" (300mm) AFF UNLESS OTHERWISE NOTED
16. PROVIDE GROUNDING WIRE FOR BELL PATCH PANEL. LEAVE 48" (1.2m) OF WIRING FOR INSTALLATION OF PATCH PANEL BY BELL.
17. 208V-3PH DIRECT CONNECTION FOR ELECTRIC WATER HEATER
18. TASK LIGHT BELLOW COUNTER TO BE CENTERED TO THE CABINET ABOVE. (TYPICAL FOR ALL TYPE 'D' LIGTING FIXTURE)
19. SUPPLY AND INSTALL ONE FIRE ALARM MANUAL PULL STATION. WORK TO BE PERFORMED BY LANDLORD CONTRACTOR AT TENANT EXPENSE.

CLIENT:
Region of Peel
Working for You
10 Peel Centre Drive
BRAMPTON

PROJECT:
MALTON PUBLIC HEALTH CLINIC
7205 Goreway Drive
Units B7&8B
MISSISSAUGA, Ontario

Project No. 1013-166

PNF ENGINEERING INC.
BUILDING SERVICES ENGINEERS
4-1290 EGLINTON AVE. EAST
MISSISSAUGA ONT. L4W 1K8
T. (905) 625-5322
F. (905) 625-0758

LICENSED PROFESSIONAL ENGINEER
DEC 6/13
S.HADZIAVDIC
PROVINCE OF ONTARIO

4	6DEC13	Revised to suite base building changes
3	20NOV13	Issued for Tender
2	5NOV13	Issued for building permit
1	09OCT13	Issued for client review
0	27SEP13	Issued for Co-ordination

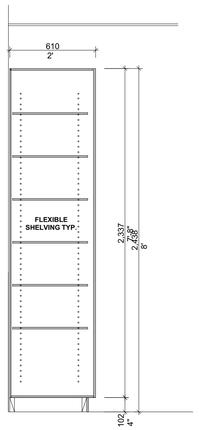
REVISIONS

DRAWING
POWER LAYOUT

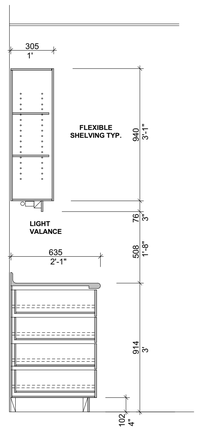
Job No.	13018
DRAWN BY:	D.R.
CHECKED:	S.H.
SCALE:	AS SHOWN

N
PROJECT NORTH

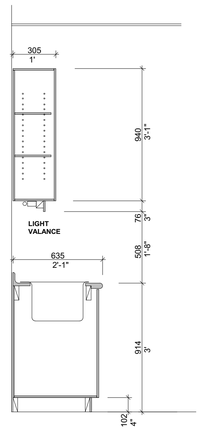
E-1
OF 3



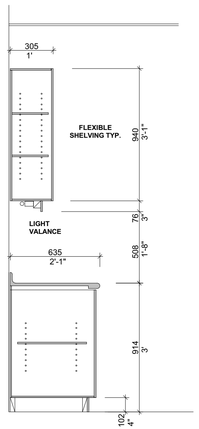
1 A05 **COUNSELLING TALL CABINET**
Scale 1:20



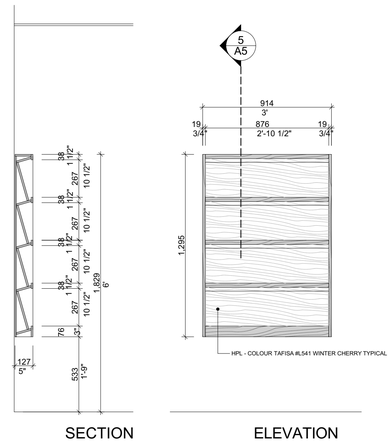
2 A05 **TYP. SECTION AT DRAWERS**
Scale 1:20



3 A05 **TYP. SECTION AT SINK**
Scale 1:20



4 A05 **FILING AND SUPPLY CABINET**
Scale 1:20



5 A05 **PAMPHLETS MILLWORK**
Scale 1:20

TYPICAL MILLWORK NOTES

CABINET CONSTRUCTION

-19mm MCP GABLES AND BOTTOM FIXED SHELF
-Gables RABBETED FOR BACK AND TOP
-BOTTOM FIXED SHELF GLUED AND STAPLED
-FASTENED TO WALL BLOCKING (W.B. BY OTERS)
-SCREWS TO BE CONCEALED WITH PLASTIC CAPS

DOOR AND DRAWER FRONTS

-19mm PARTICLE BOARD
-P.LAM FINISH C/W MATCHING 2mm VYNIL EDGING
-COLOUR TO BE APPROVED BY CONSULTANTS

CABINET COUNTERS

-19mm PLYWOOD WITH POST FORM P.LAM FINISH
-COLOUR TO BE APPROVED BY CONSULTANTS
-35mm BULL-NOSING TYPICAL AT COUNTER FRONTS AND 76mm BACK SPLASH AT WALL

DRAWERS

-BOTTOM FLAKE 13mm PARTICLE BOARD WHITE MELAMINE FINISH
-HAFELE_ZARGEN DRAWER SYSTEM WITH SELF-CLOSING MECHANISM

ADJUSTABLE SHELVES

-19mm PARTICLE BOARD
-WHITE MELAMINE FINISH
-METAL PINS (GABLE HOLES AT 25mm OR METAL STRIP)

BACK PANELS

-6mm PREFINISHED HARDBOARD C/W REQUIRED WOOD BLOCKING

CABINET KICKPLATE

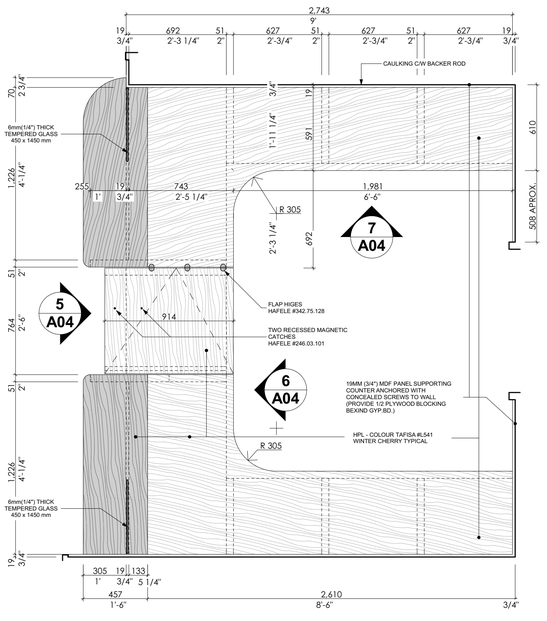
-13mm PARTICLE BOARD C/W REQUIRED WOOD BLOCKING
-P.LAM FINISH C/W MATCHING 2mm VYNIL EDGING (UNLESS NOTED)
-COLOUR TO BE APPROVED BY CONSULTANTS

HARDWARE

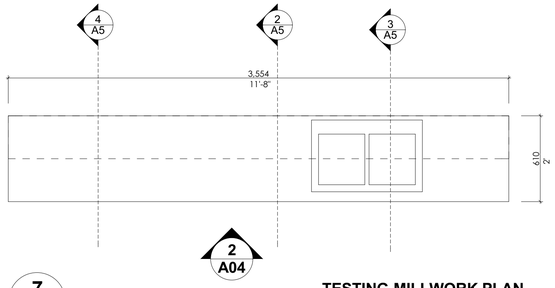
-**HINGES**: HAFELE_S-SERIES CONCEALED STAINLESS STEEL HINGE FOR ALL DOORS
-**DOOR LOCKS**: HAFELE_SYMO 3000 DEADBOLT RIM LOCKS C/W PLATE-CYLINDERS KEYS. MASTER KEY FOR EVERY ROOM/AREA.
-**DRAWER LOCKS**: HAFELE_CENTRAL LOCKING SINGLE PEDESTAL FRONT MOUNTE. MASTER KEY FOR EVERY ROOM/AREA.
-**BUMPERS**: HAFELE_DOOR POLYURETHANE TRANSPARENT BUMPERS

PULLS

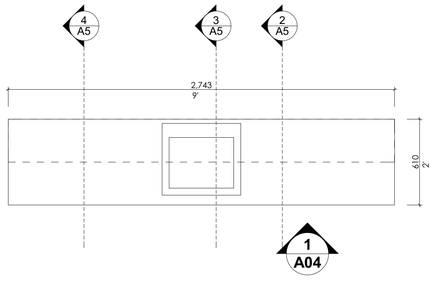
-**CABINET DOORS AND DRAWERS:**
-RICHELIEU #33205 PULL BRUSHED NICKEL FINISH 195 COLOUR



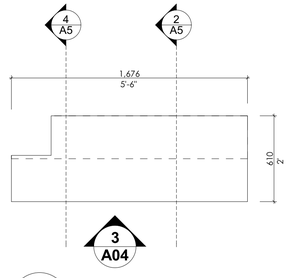
6 A05 **RECEPTION DESK MILLWORK PLAN**
Scale 1:20



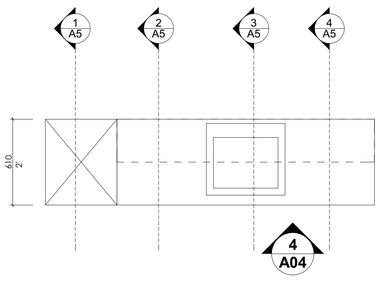
7 A05 **TESTING MILLWORK PLAN**
Scale 1:20



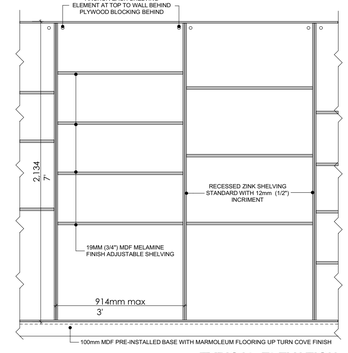
9 A05 MEETING & LUNCH ROOM **MILLWORK PLAN**
Scale 1:20



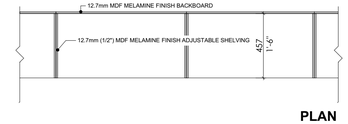
8 A05 **NEEDLE EXCHANGE**
Scale 1:20



10 A05 **COUNSELLING RM. MILLWORK PLAN**
Scale 1:20


ANCHOR EACH SHELVING ELEMENT AT TOP TO WALL BEHIND PLYWOOD BLOCKING BEHIND
2,134
7'
RECESSED ZINK SHELVING STANDARD WITH 12mm (1/2") INCRIMENT
19MM (3/4") MDF MELAMINE FINISH ADJUSTABLE SHELVING
914mm max
3'
100mm MDF PRE-INSTALLED BASE WITH MARMOLEUM FLOORING UP TURN COVE FINISH

TYPICAL ELEVATION



PLAN

11 A05 **TYPICAL STORAGE SHELVING**
Scale 1:20

CLIENT :
Appendix 7.10

Region of Peel

Real Property Asset Management
Construction Project Management
10 Peel Centre Drive, Suite B 6th Flr.
Brampton, ON L6T 4B9

ARCHITECT

ATELIER ARCHITECT MADUNIC INC.
ARCHITECTURE
URBAN DESIGN
1290 EGLINTON AVE, SUITE No.3
MISSISSAUGA, ON. L4W 1K8
T 905 206 1532 F 905 206 0514
andy@aamadunic.com
ONTARIO ASSOCIATION OF ARCHITECTS
ZARKO MADUNIC
LICENCE
5935

CONSULTANTS

MECHANICL&ELECTRICAL

PNF Engineering Inc.
1290 Eglinton Ave East,
Suite #1 Mississauga,
T 905 625 5322
Email dragan@pnfeng.com

No.	DATE	DESCRIPTION
	10DEC13	Tender Rev. Base Building Plan Coordin.
	20NOV13	Tender
	13NOV13	Building Permit - Submission
	28OCT13	Building Permit - Final Sign-off
	27SEP13	Building Permit - Review

DRAWING ISSUANCES AND REVISIONS

GENERAL NOTES

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P R O J E C T :

PEEL PUBLIC HEALTH CLINIC

7205 Goreway Drive, MISSISSAUGA

Project No. 2013-166

MILLWORK PLAN & SECTIONS

PROJECT No.	**2013-11**
DRAWN BY	**A.Z.M.**
PRINTED:	**12/11/2013**
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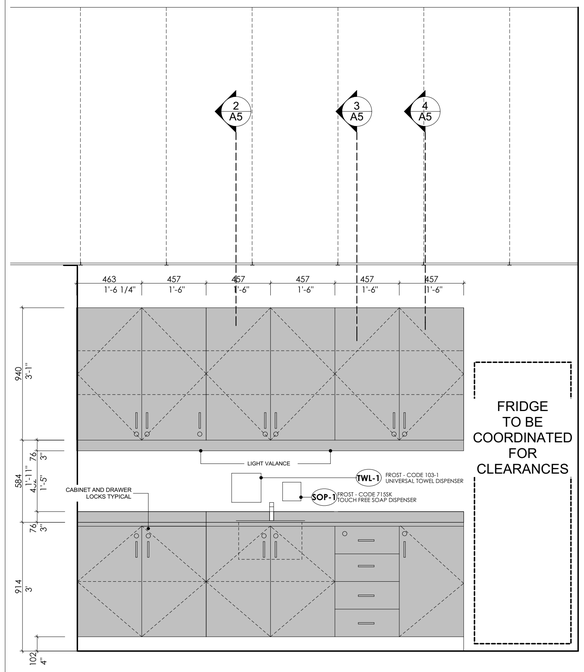
PROJECT NORTH / N

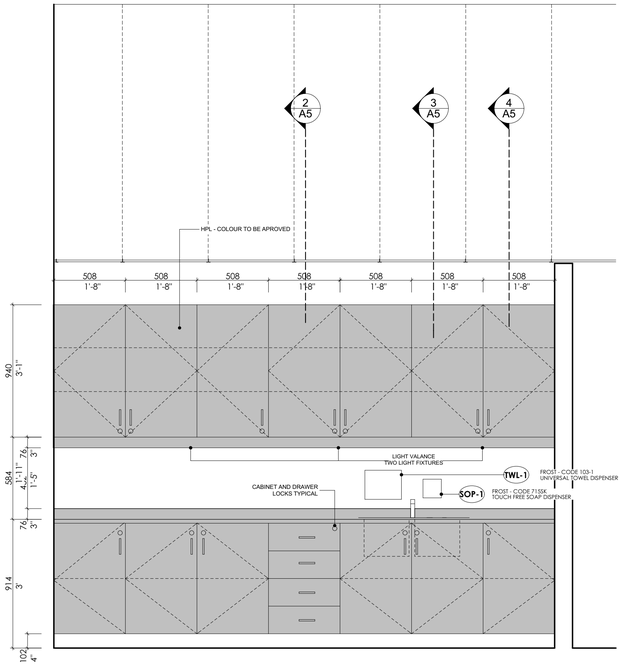
PAGE No.

A-05



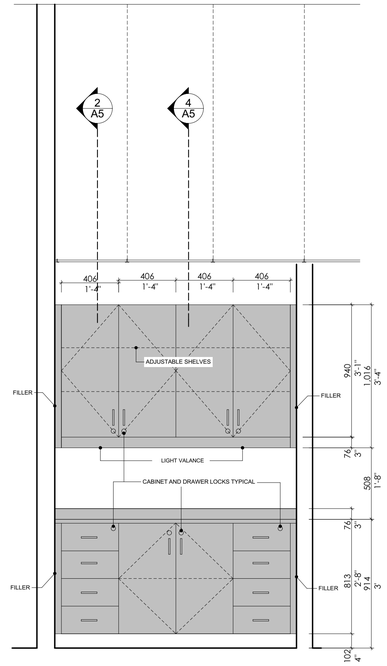
1 / A04 MEETING & **LUNCH ROOM MILLWORK ELEVATION**

Scale 1:20



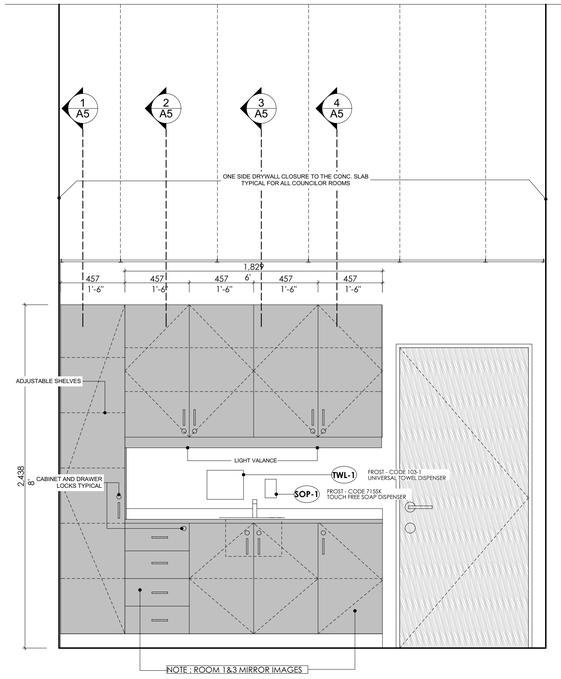
2 / A04 **TESTING ROOM MILLWORK ELEVATION**

Scale 1:20



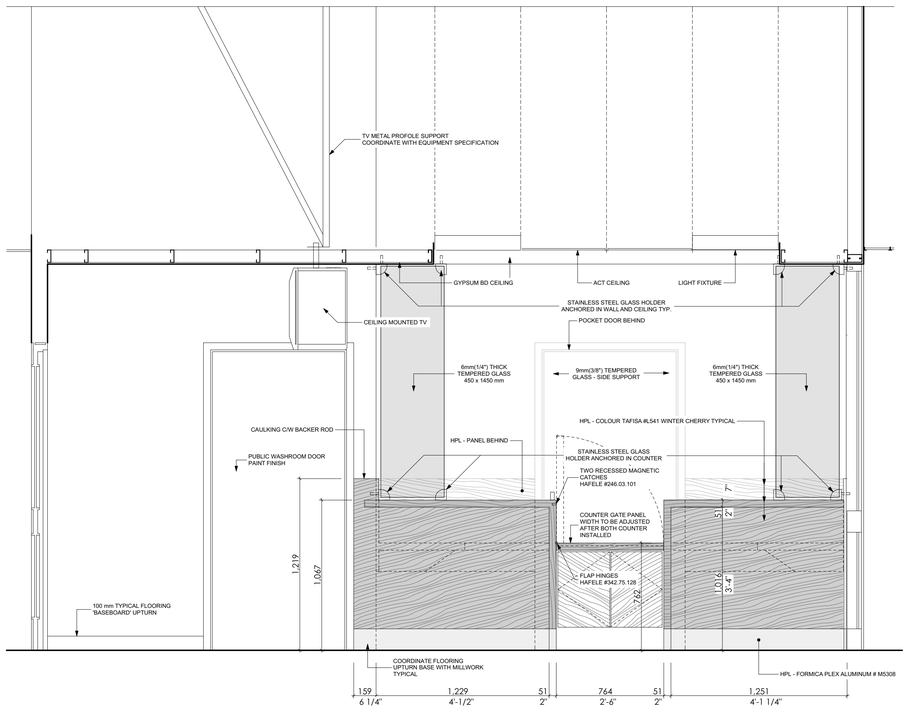
3 / A04 **NEEDLE EXCHANGE MILLWORK ELEVATION**

Scale 1:20



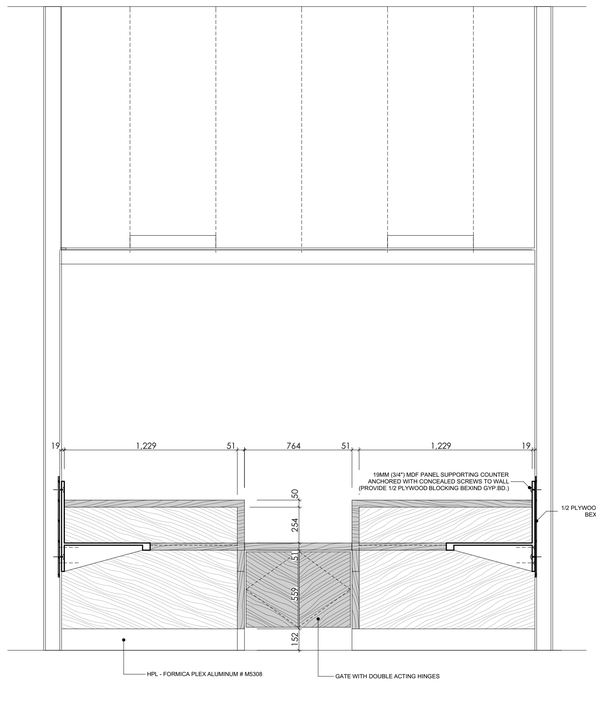
4 / A04 **COUNSELLING ROOMS 1- 4 TYPICAL MILLWORK ELEVATION**

Scale 1:20


TV METAL PROFOLE SUPPORT COORDINATE WITH EQUIPMENT SPECIFICATION
GYPSUM BD CEILING
ACT CEILING
LIGHT FIXTURE
STAINLESS STEEL GLASS HOLDER ANCHORED IN WALL AND CEILING TYP.
CEILING MOUNTED TV
POCKET DOOR BEHIND
6mm(1/4") THICK TEMPERED GLASS 450 x 1450 mm
9mm(3/8") TEMPERED GLASS - SIDE SUPPORT
6mm(1/4") THICK TEMPERED GLASS 450 x 1450 mm
CAULKING C/W BACKER ROD
HPL - COLOUR TAFISA #L541 WINTER CHERRY TYPICAL
HPL - PANEL BEHIND
PUBLIC WASHROOM DOOR PAINT FINISH
STAINLESS STEEL GLASS HOLDER ANCHORED IN COUNTER
TWO RECESSED MAGNETIC CATCHES HAFELE #246.03.101
COUNTER GATE PANEL WIDTH TO BE ADJUSTED AFTER BOTH COUNTER INSTALLED
FLAP HINGES HAFELE #342.75.128
1,219
1,067
100 mm TYPICAL FLOORING "BASEBOARD" UPTURN
COORDINATE FLOORING UPTURN BASE WITH MILLWORK TYPICAL
HPL - FORMICA PLEX ALUMINUM # M5308
159 6 1/4"
1,229 4'-1/2"
51 2"
764 2'-6"
1,251 4'-1 1/4"

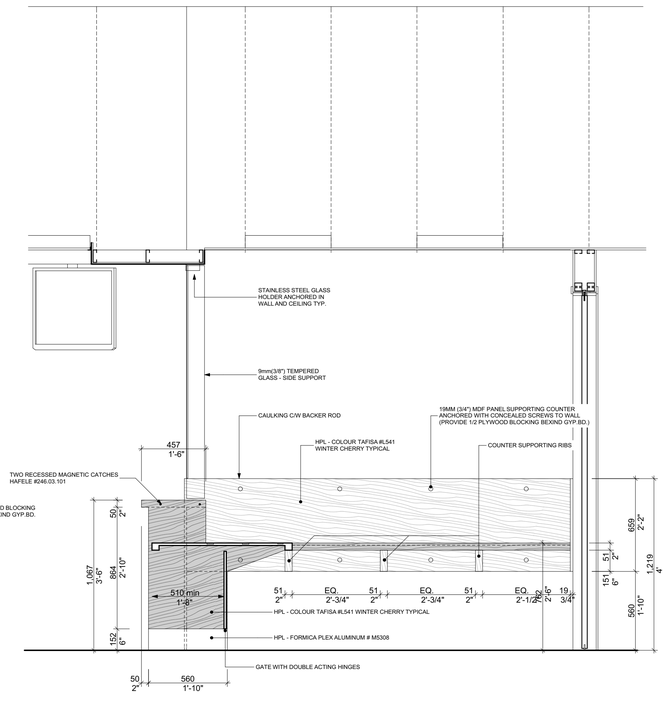
5 / A04 **RECEPTION MILLWORK ELEVATION 'A' (WAITING ROOM)**

Scale 1:20



6 / A04 **RECEPTION MILLWORK SECTION / ELEVATION 'B'**

Scale 1:20


STAINLESS STEEL GLASS HOLDER ANCHORED IN WALL AND CEILING TYP.
9mm(3/8") TEMPERED GLASS - SIDE SUPPORT
CAULKING C/W BACKER ROD
19MM (3/4") MDF PANEL SUPPORTING COUNTER ANCHORED WITH CONCEALED SCREWS TO WALL (PROVIDE 1/2 PLYWOOD BLOCKING BEXIND GYP.BD.)
HPL - COLOUR TAFISA #L541 WINTER CHERRY TYPICAL
COUNTER SUPPORTING RIBS
TWO RECESSED MAGNETIC CATCHES HAFELE #246.03.101
457 1'-6"
1,067 3'-6"
864 2'-10"
152 6"
659 2'-2"
51 2"
151 6"
1,219 4"
560 1'-10"
510 min 1'-8"
HPL - COLOUR TAFISA #L541 WINTER CHERRY TYPICAL
HPL - FORMICA PLEX ALUMINUM # M5308
GATE WITH DOUBLE ACTING HINGES
50 2"
560 1'-10"

7 / A04 **RECEPTION MILLWORK SECTION / ELEVATION 'B'**

Scale 1:20

CLIENT :

Appendix 7.1

Region of Peel

Real Property Asset Management
Construction Project Management
10 Peel Centre Drive, Suite B 6th Flr.
Brampton, ON L6T 4B9

ARCHITECT

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MECHANICL&ELECTRICAL

PNF Engineering Inc.
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Email dragan@pnfeng.com

No.	DATE	DESCRIPTION
	10DEC13	Tender Rev. Base Building Plan Coordin.
	20NOV13	Tender
	13NOV13	Building Permit - Submission
	28OCT13	Building Permit - Final Sign-off
	27SEP13	Building Permit - Review

DRAWING ISSUANCES AND REVISIONS

GENERAL NOTES

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P R O J E C T :

PEEL PUBLIC HEALTH CLINIC

7205 Goreway Drive, MISSISSAUGA

Project No. 2013-166

INTERIOR & MILLWORK ELEVATIONS

PROJECT No.	**2013-11**
DRAWN BY	**A.Z.M.**
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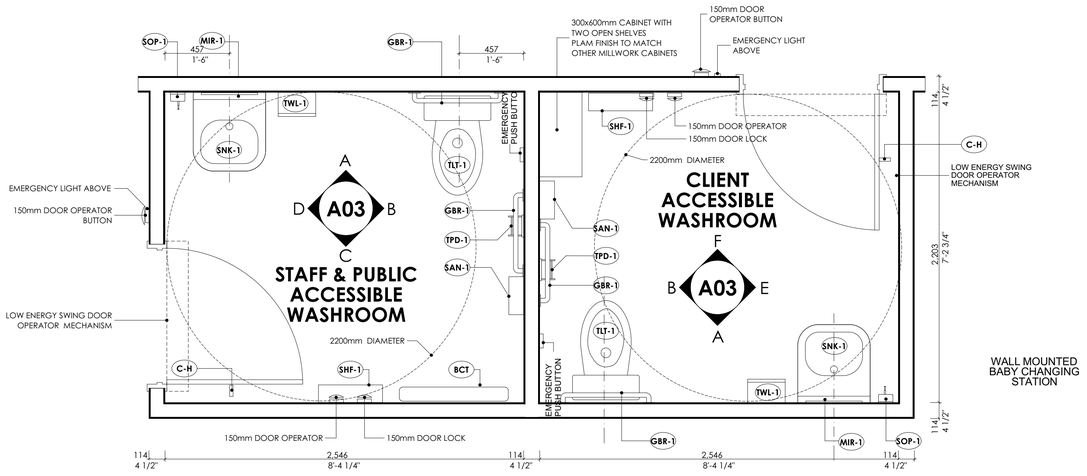
SCALE:	**AS SHOWN**

PROJECT NORTH / N

PAGE No.

A-04



1
A3

ACCESSIBLE WASHROOM PLAN

SCALE 3/4"= 1'-0"

GENERAL NOTES

WHEELCHAIR ACCESSIBLE WRM. TO COMPLY TO:
- O.B.C.; B-3.8.3.12 and APPENDIX A-3.8.3.8; A-3.8.3.11 and A-3.8.3.12
- CSA STANDARD 'Accessible design for the built environment' - CAN/CSA -B651-04.

PROVIDE BLOCKING WITHIN WALL AS NECESSARY FOR ANCHORING OF GRAB BARS AND SINK . MAINTAIN 40 mm CLEAR SPACE BETWEEN GRAB BARS AND WALL.

PROVIDE FAUCETS WITH SENSORS FOR THERMOSTATIC CONTROL OF WATER TEMPERATURE (MAXIMUM 55 DEGREE CELSIUS). FAUCET TO HAVE LEVER TYPE CONTROLS AS PER AM- ACCESSIBILITY PRODUCT STANDARDS.

MINIMUM WASHROOM ILLUMINATION TO BE 250 LUX.

MAINTAIN DISPENSING HEIGHT FOR ALL WASHROOM ACCESSORIES AT MAX 1200 mm.

LEGEND:

TLT-1	SEE PLUMBING SPECS
SNK-1	SEE PLUMBING SPECS
GBR-1	GRAB BARS - ASI #3800 SERIES
TPD-1	FROST - CODE 165 MULTI-ROLL TOILET TISSUE DISPENSER, RESERVE ROLL
SAN-1	FROST - CODE 303-3 WALL MOUNTED WASTE RECEPTACLE
TWL-1	FROST - CODE 103-1 UNIVERSAL TOWEL DISPENSER
MIR-1	TILTED MIRROR
SOP-1	FROST - CODE 7155K TOUCH FREE SOAP DISPENSER
C-H	SURFACE MOUNTED COAT HOOK - BOBRICK B-6827
SHF-1	SURFACE MOUNTED STAINLESS STEEL SHEF - BOBRICK B-295x18
BCT	KOALA - CODE KB 100-05 WALL MOUNTED BABY CHANGING STATION

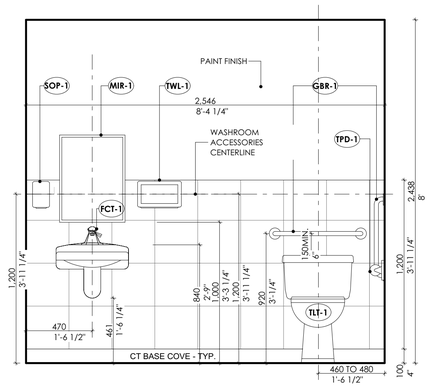
WASHROOM FLOOR AND WALL FINISH

FLOORING AND BASE:
SAFETY SHEET VINYL

BASEBOARD :
100mm COVED SSV

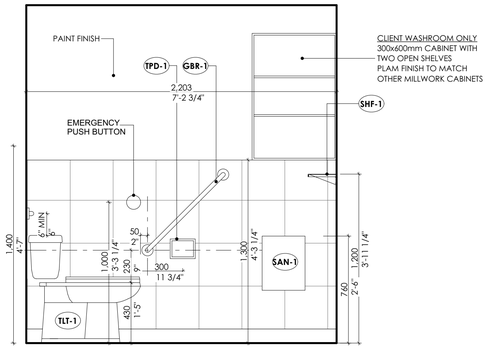
WALL TILE:
305 mm x 305 mm OMNIA BY OLYMPIA TILE
Colour 'BOTTICINO' (BEIGE)

GROUT:
MOLD RESISTANT 100% EPOXY
Colour MATCH TILE



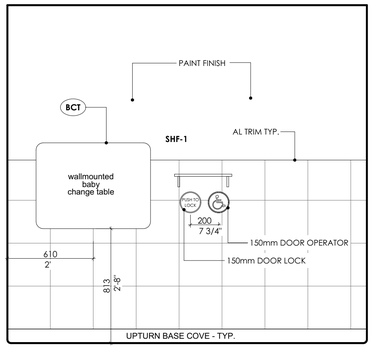
ELEVATION A

SCALE 3/4"= 1'-0"



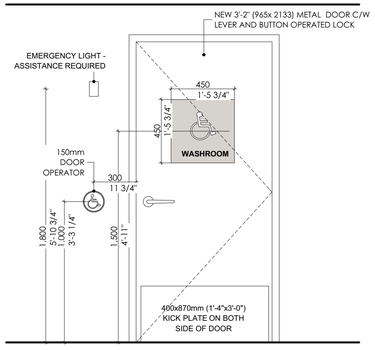
ELEVATION B

SCALE 3/4"= 1'-0"



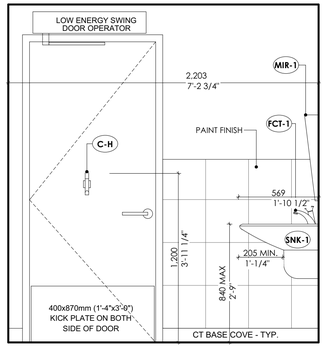
ELEVATION C

SCALE 3/4"= 1'-0"



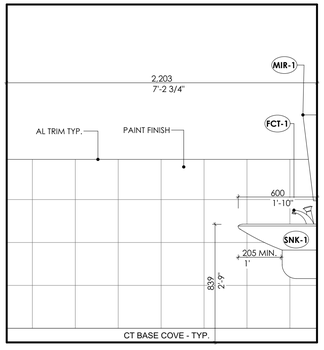
WASHROOM DOOR CORRIDOR ELEVATION

SCALE 3/4"= 1'-0"



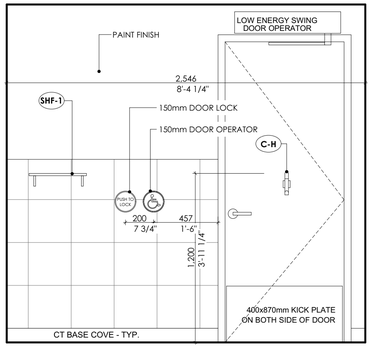
ELEVATION D

SCALE 3/4"= 1'-0"



ELEVATION E

SCALE 3/4"= 1'-0"



ELEVATION F

SCALE 3/4"= 1'-0"

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P R O J E C T :

PEEL PUBLIC HEALTH CLINIC

7205 Goreway Drive, MISSISSAUGA

Project No. 2013-166

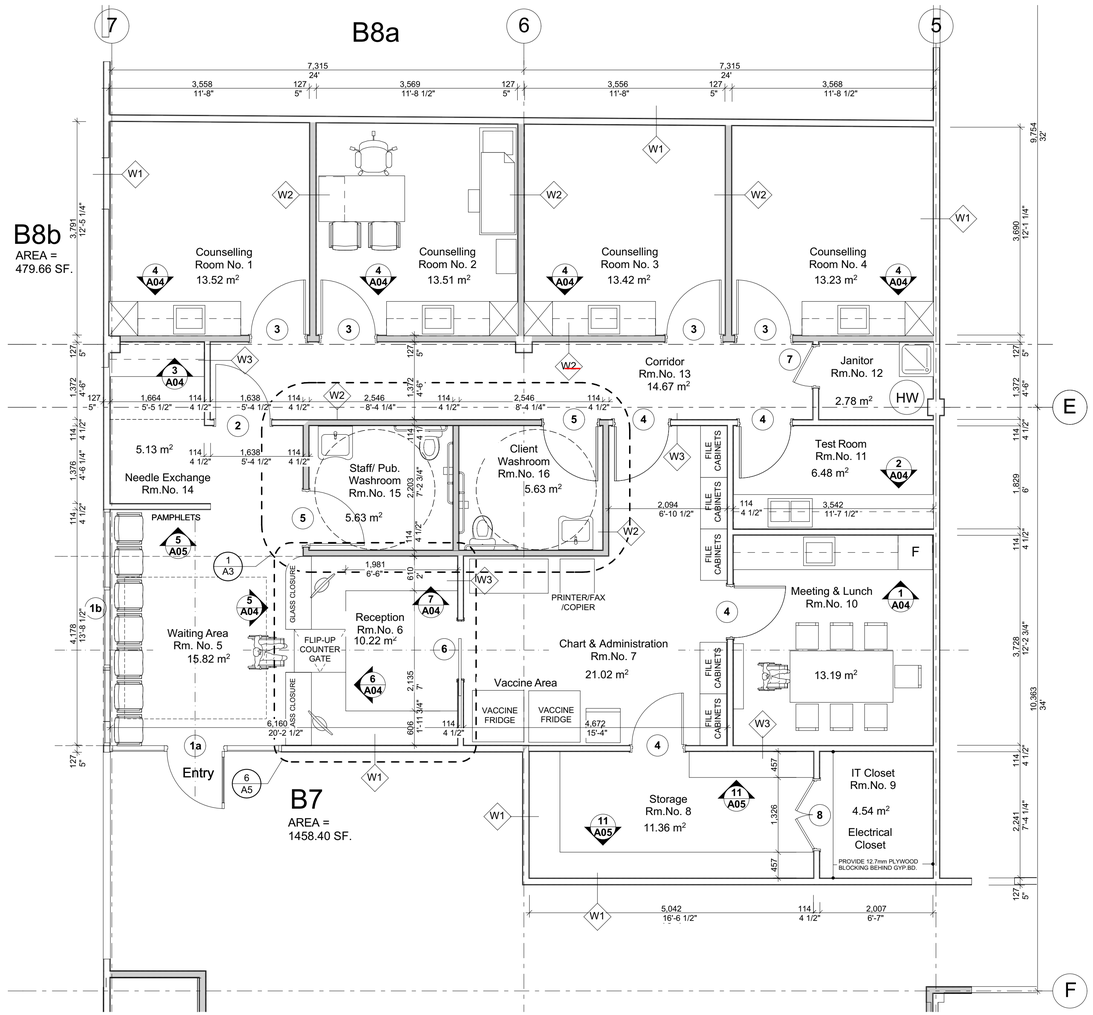
WASHROOM PLAN & ELEVATIONS

PROJECT No.	2013-11
DRAWN BY	A.Z.M.
PRINTED:	12/11/2013
SCALE:	AS SHOWN

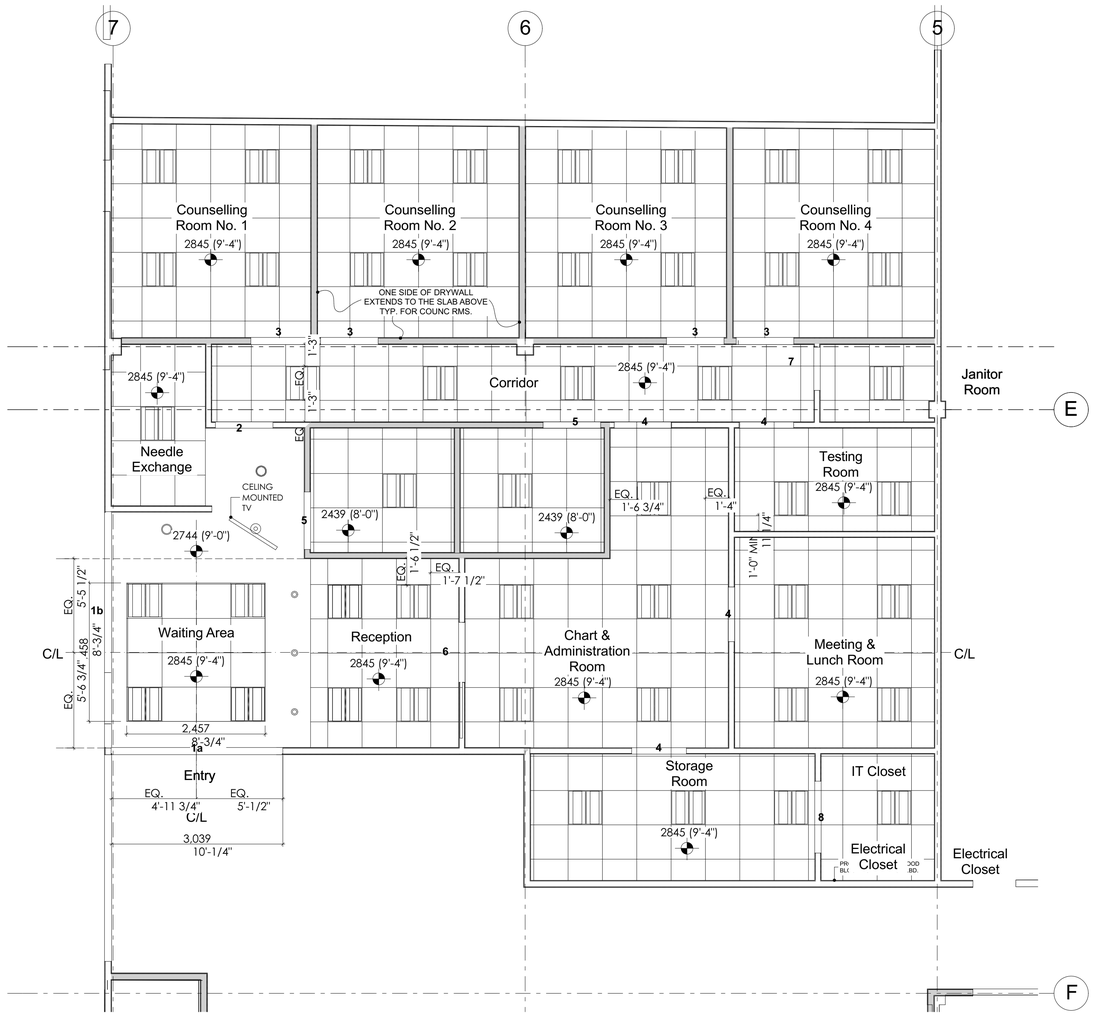
PROJECT NORTH — N

PAGE No.

A-03



2 FLOOR PLAN
SCALE: 1:50



1 CEILING PLAN
SCALE: 1:50

ROOM FINISH SCHEDULE

ROOM		FLOOR	BASE	WALLS				CEILING	BULKHEAD
				NORTH	SOUTH	WEST	EAST		
01 COUNSELLING OFFICE	MAT.			GB	GB	GB	GB	ACT	
	FIN.	SVW	RB	PT-x	PT-x	PT-x	PT-x		
02 COUNSELLING OFFICE	MAT.			GB	GB	GB	GB	ACT	
	FIN.	SVW	RB	PT-x	PT-x	PT-x	PT-x		
03 COUNSELLING OFFICE	MAT.			GB	GB	GB	GB	ACT	
	FIN.	SVW	RB	PT-x	PT-x	PT-x	PT-x		
04 COUNSELLING OFFICE	MAT.			GB	GB	GB	GB	ACT	
	FIN.	SVW	RB	PT-x	PT-x	PT-x	PT-x		
05 WAITING ROOM	MAT.			GB				GB / ACT	
	FIN.	MLF	MLB	PT-x			PT-x		
06 RECEPTION	MAT.			GB	GB		GB	ACT	
	FIN.	MLF	MLB	PT-x	PT-x		PT-x		
07 ADMIN, CHART & VACCINE ROOM	MAT.			GB	GB	GB	GB	ACT	
	FIN.	MLF	MLB	PT-x	PT-x	PT-x	PT-x		
08 MEETING / LOUNCH ROOM	MAT.			GB	GB	GB	GB	ACT	
	FIN.	MLF	MLB	PT-x	PT-x	PT-x	PT-x		
09 STORAGE	MAT.			GB	GB	GB	GB	ACT	
	FIN.	MLF	MLB	PT-x	PT-x	PT-x	PT-x		
10 IT / ELECTRICAL ROOM	MAT.			GB	GB	GB	GB	ACT	
	FIN.	MLF	MLB	PT-x	PT-x	PT-x	PT-x		
11 TESTING ROOM	MAT.			GB	GB	GB	GB	ACT	
	FIN.	MLF	MLB	PT-x	PT-x	PT-x	PT-x		
12 JANITOR	MAT.			GB	GB	GB	GB	ACT	
	FIN.	SSF	SSB	CWT	CWT	CWT	CWT		
13 CLINIC CORRIDOR	MAT.			GB	GB	GB	GB	ACT	
	FIN.	MLF	MLB	PT-x	PT-x	PT-x	PT-x		
14 NEEDLE EXCHANGE ROOM	MAT.			GB	GB	GB	GB	ACT	
	FIN.	MLF	MLB	PT-x	PT-x	PT-x	PT-x		
15 STAFF / PUBLIC WRM.	MAT.			GB	GB	GB	GB	ACT	
	FIN.	SSF	SSB	APD	APD	APD	APD		
16 CLIENT WRM.	MAT.			GB	GB	GB	GB	ACT	
	FIN.	SSF	SSB	APD	APD	APD	APD		

ACRONYMS LEGEND

SVW	SHEET VYNIL WOOD PATTERN FLOORING	ACT	ACOUSTIC CEILING TILE
MLF	SHEET MARMOLEUM FLOORING	APD	AS PER DRAWING
MLB	MARMOLEUM UP-TURN COVE BASE	AL	ALUMINUM
SSF	SAFETY SHEET VYNIL FLOORING	CLA	CLEAR ANODIZED
SSB	SAFETY SHEET VYNIL UP-TURN COVE BASE	WD	WOOD PARTICLE
RB	RUBBER BASE	MT	METAL
GB	GYPSUM BOARD	PT	AS PER DRAWING
PT-x	PAINT FINISH - X colour code	TFM	THERMALLY FUSED MELAMINE
CWT	CERAMIC/PORCELAIN TILE	HM	HOLOW METAL

WALL LEGEND

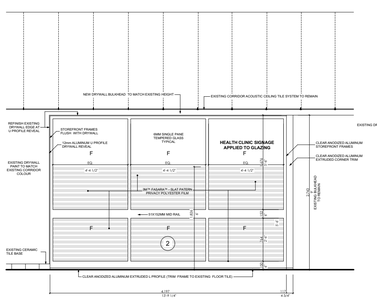
W1 — **Existing Demising Walls 0H FR**
-12.7 mm GBD
-102mm STSD @ 400mm O.C.
-15.9 mm GBD
(Extended to the slab)

W2 — **Interior Partitions to the Underside of Roof Deck**
-12.7 mm GBD
-89mm STSD @ 400mm O.C.
-38mm Sound Attenuation
-12.7 mm GBD

W3 — **Interior Partitions to the Ceiling**
-12.7 mm GBD
-89mm STSD @ 400mm O.C.
-12.7 mm GBD

DOOR SCHEDULE

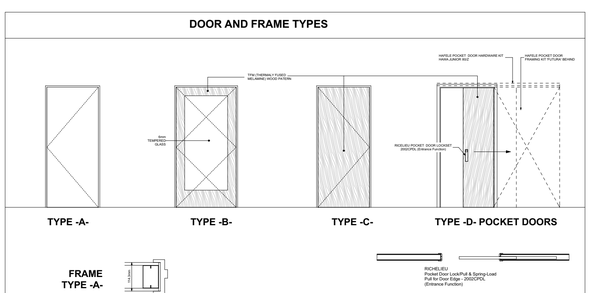
DOOR No.	DOOR TYPE	DOOR WIDTH	DOOR HEIGHT	DOOR THICKNESS	DOOR MATERIAL	DOOR FINISH	FRAME TYPE	FRAME MATERIAL	FRAME FINISH	THRESHOLD	WEATHER STRIPPING	LVL LABEL	DOOR CLOSER	PANIC HARDWARE	DOOR OPENER	REMARKS
1a	N/A	1016	2134	45	AL	CLA	N/A	N/A	N/A					●	●	ENTRY DOOR SEE DWG 3/A02 POWER ASSISTED OPENER
1b	N/A	N/A	2134	45	AL	CLA	N/A	N/A	N/A							CORRIDOR GLAZED CLOSURE SEE DWG 4/A02
02	B	965	2134	45	WD	TFM	A	HM	PT						●	GLAZED DOOR POWER ASSISTED OPENER
03	C	965	2134	45	WD	TFM	A	HM	PT							
04	A	965	2134	45	MT	PT	A	HM	PT							
05	A	965	2134	45	MT	PT	A	HM	PT	●					●	POWER ASSISTED OPENER/LOCK (BARRIER FREE WASHROOMS)
06	D	965	2134	45	WD	TFM	A	HM	PT							RICHELIEU Pocket Door Lock/Pull 2002CPDL (Entrance Function)
07	A	711	2134	45	MT	PT	A	HM	PT							
08	A	2x610	2134	45	MT	PT	A	HM	PT							


NEW DRYWALL BULKHEAD TO MATCH EXISTING HEIGHT
EXISTING CORRIDOR ACOUSTIC CEILING TILE SYSTEM TO REMAIN
STOREFRONT FRAMES FLUSH WITH DRYWALL
12mm ALUMINUM U PROFILE DRYWALL REVEAL
89MM SINGLE FRAME TEMPERED GLASS PARTITION
HEALTH CLINIC SIGNAGE APPLIED TO GLAZING
CLEAR ANODIZED ALUMINUM EXTRUDED CORNER TRIM
EXISTING DRYWALL BULKHEAD TO REMAIN
EXISTING CORRIDOR ACOUSTIC CEILING TILE SYSTEM TO REMAIN
CLEAR ANODIZED ALUMINUM PANEL
EXISTING DRYWALL BULKHEAD TO REMAIN
89MM SINGLE FRAME TEMPERED GLASS PARTITION
AUTOMATIC DOOR OPERATOR
HEALTH CLINIC SIGNAGE APPLIED TO GLAZING
CLEAR ANODIZED ALUMINUM DOOR FRAME
100mm DOOR OPENING
STAINLESS STEEL PULL HANDLE
89MM SINGLE FRAME TEMPERED GLASS PARTITION
ALUMINUM THRESHOLD
12mm ALUMINUM U PROFILE DRYWALL REVEAL
EXISTING DRYWALL BULKHEAD TO REMAIN
EXISTING CERAMIC TILE BASE
CLEAR ANODIZED ALUMINUM EXTRUDED L PROFILE (TRIM FRAME TO EXISTING FLOOR TILE)

3 A02 CORRIDOR GLAZED CLOSURE
Scale 1:50

4 A02 HEALTH CLINIC ENTRY DOOR
Scale 1:20

DOOR AND FRAME TYPES


TYPE -A-
TYPE -B-
TYPE -C-
TYPE -D- POCKET DOORS
FRAME TYPE -A-
TFM THERMALLY FUSED MELAMINE WOOD PATTERN
6MM TEMPERED GLASS
HANDLE POCKET DOOR HARDWARE KIT
HANDLE POCKET DOOR FRAMING KIT TO FLOOR BEYOND
RICHELIEU POCKET DOOR LOCK/KIT (INSTALL EXAMPLE)
RICHELIEU Pocket Door Lock/Pull & Spring-Load Pull for Door Edge - 2002CPDL (Entrance Function)

CLIENT:
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Real Property Asset Management
Construction Project Management
10 Peel Centre Drive, Suite B 6th Flr.
Brampton, ON L6T 4B9

ARCHITECT
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Suite #1 Mississauga,
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Email dragan@pnfeng.com

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	13NOV13	Building Permit - Submission
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	27SEP13	Building Permit - Review

DRAWING ISSUANCES AND REVISIONS

GENERAL NOTES

DRAWINGS AND SPECIFICATIONS PREPARED BY THE ARCHITECT ARE HIS COPYRIGHT PROPERTY AND SHELL BE RETURNED TO HIM UPON REQUEST. REPRODUCTION OF DRAWINGS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE ARCHITECT'S WRITTEN PERMISSION.

PROJECT:

PEEL PUBLIC HEALTH CLINIC

7205 Goreway Drive, MISSISSAUGA

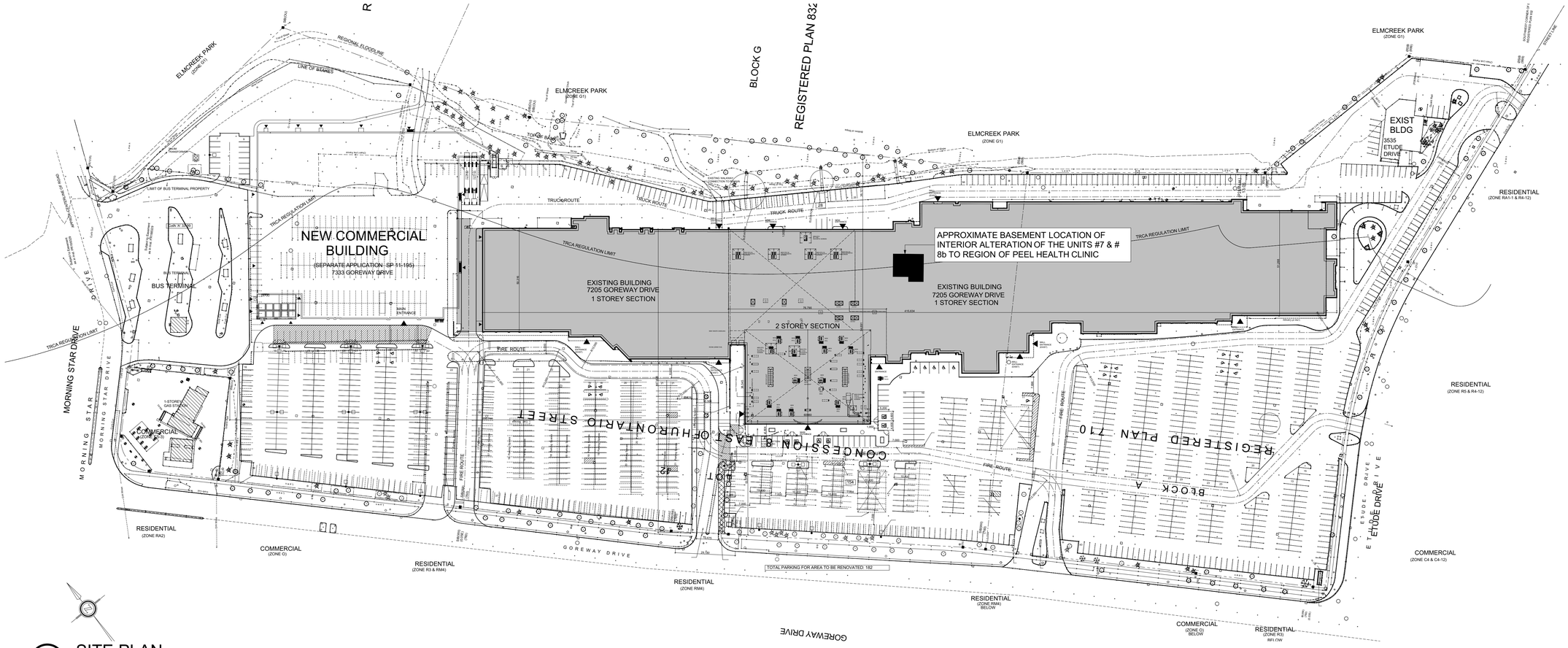
Project No. 2013-166

FLOOR & CEILING PLAN

PROJECT No.	2013-11
DRAWN BY	A.Z.M.
PRINTED:	12/11/2013
SCALE:	AS SHOWN

PROJECT NORTH — N

PAGE No. **A-02**



1 SITE PLAN
SCALE: 1:1000

ATELIER ARCHITECT MADUNIC INC.
ARCHITECTURE URBAN DESIGN
1290 EGLINTON AVE E. Suite 3 MISSISSAUGA , L4W 1K8
Tel:905.206.1532 - Cell 416.707.1353 - andy@aamadunic.com

ONTARIO ASSOCIATION OF ARCHITECTS
ZARKO MADUNIC
LICENCE
5385

Name of Project: PEEL PUBLIC HEALTH CLINIC
Location: **Westwood Mall,**
7205 Goreway Drive, City of Mississauga

Item	Ontario's 2006 Building Code Compendium Data Matrix Part 3 or 9			BCC Reference References are to Division B unless noted [A] for Division A or [C] for Division C.	
1	Project Description:	ı New ı Addition ı Change of Use ■ Alteration	ı Part 11 11.1 to 11.4	■ Part 3	ı Part 9
				1.1.2. [A]	1.1.2. [A] & 9.10.1.3.
2	Major Occupancy(s): **D** BUSINESS and PERSONAL SERVICES			3.1.2.1.(1)	9.10.2.
3	Building Area (m²) 27,342.23	Existing N/A	UNITS #7 & #8b Alteration **180.0m²**	Total N/A	1.4.1.2. [A]	1.4.1.2. [A]
4	Gross Area 24,608	Existing :	New: **N/A**	Total **N/A**	1.4.1.2. [A]	1.4.1.2. [A]
5	Number of Storeys	Above grade **2**	Below grade **1**		1.4.1.2. [A]3.2.1.1.	1.4.1.2[A] & 9.10.4
6	Number of Streets/Fire Fighter Access: **TWO**				3.2.2.10. & 3.2.5.	9.10.20.
7	Building Classification: **3.2.2.57.**				3.2.2.47	9.10.2.
8	Sprinkler System Proposed		**ENTIRE BUILDING**		3.2.2.20.-.83	9.10.8.2.
9	Standpipe required		ı Yes ■ No		3.2.9.	N/A
10	Fire Alarm required		■ Yes ı No		3.2.4.	9.10.18.
11	Water Service/Supply is Adequate		■ Yes ı No		3.2.5.7.	N/A
12	High Building		ı Yes ■ No		3.2.6.	N/A
13	Construction Restrictions	ı Combustible permitted	ı Non-combustible required ı Both		3.2.2.20.-.83	9.10.6.
	Actual Construction	ı Combustible	■ Non-combustible ı Both			
14	Mezzanine(s) Area m² **N/A**				3.2.1.1.(3)-(8)	9.10.4.1.
15	Occupant load based on **9.3** person /100 m² ı design of building **16.4 PERSONS** Occupancy **D** (Additional floor areas continued below)				3.1.17.	9.9.1.3.
16	Barrier-free Design	■Yes ı No (Explain)			3.8.	9.5.2.
17	Hazardous Substances	ı Yes ■ No			3.3.1.2. & 3.3.1.19.	9.10.1.3.(4)

NOTE: Washrooms provided on premises are in addition to the public washrooms provided by basic building: number of water closets is based on facility design and accessibility requirements.

2 MaltonHealthClinic-OBC Data Matrix
SCALE: 1:1.16

CLIENT :
Appendix 7.1

Region of Peel
Real Property Asset Management
Construction Project Management
10 Peel Centre Drive, Suite B 6th Flr.
Brampton, ON L6T 4B9

ARCHITECT

ATELIER ARCHITECT MADUNIC INC.
ARCHITECTURE URBAN DESIGN
1290 EGLINTON AVE, SUITE No.3
MISSISSAUGA, ON. L4W 1K8
T 905 206 1532 F 905 206 0514
andy@aamadunic.com

ONTARIO ASSOCIATION OF ARCHITECTS
ZARKO MADUNIC
LICENCE
5385

CONSULTANTS

MECHANICL&ELECTRICAL

PNF Engineering Inc.
1290 Eglinton Ave East,
Suite #1 Mississauga,
T 905 625 5322
Email dragan@pnfeng.com

No.	DATE	DESCRIPTION
	10DEC13	Tender Rev. Base Building Plan Coordin.
	20NOV13	Tender
	13NOV13	Building Permit - Submission
	28OCT13	Building Permit - Final Sign-off
	27SEP13	Building Permit - Review

DRAWING ISSUANCES AND REVISIONS

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PROJECT :

PEEL PUBLIC HEALTH CLINIC

7205 Goreway Drive, MISSISSAUGA

Project No. 2013-166

SITE PLAN & STATISTICS

PROJECT No.	**2013-11**
DRAWN BY	**A.Z.M.**
PRINTED:	**12/11/2013**
SCALE:	**AS SHOWN**

PROJECT NORTH N

PAGE No.
A-01

Region of Peel
Working for you

Certificate of Insurance

Region's Contract No.:

This is to certify that the following policies of insurance, subject to their terms, conditions, and exclusions, have been issued and are at present in force for the insured named below, with the specified insurer.

Name and Address of Insured
Description of Operations
Location of Operations (attach separate sheet if necessary)

Type of Insurance	Policy Number	Effective Date Y M D	Expiry Date Y M D	Limits of Liability Bodily Injury and Property Damage-Incl.
Commercial General Liability				$ /Occurrence $ Annual Aggregate Deductible $
Name and Address of Insurance Company				

The Commercial General Liability Policy includes bodily injury including death and personal injury liability, occurrence property damage, contractual liability, non-owned automobile liability, owner's and contractor's protective coverage, products-completed operations, employer's liability contingent employer's liability, cross liability and severability of interests clauses.

The Policy contains no exclusions or limitations with respect to the blasting, shoring underpinning, raising or demolition of any building or structure or subsidence of any property, or land from any cause.

Note: Shaded Area Refers Only to Construction Contracts.

Type of Insurance	Policy Number	Effective Date Y M D	Expiry Date Y M D	Limits of Liability
Automobile				$ /Claim or loss Deductible $
Name and Address of Insurance Company				
Professional Liability				$ /Claim $ Annual Aggregate Deductible $
Name and Address of Insurance Company				
Other (specify)				$ /Occurrence $ Annual Aggregate Deductible $
Name and Address of Insurance Company				

Any Umbrella and/or excess insurance is in excess of both the Commercial General Liability and Automobile Liability policies. The Regional Municipality of Peel and/or Peel Housing Corporation – O/A Peel Living and _____

_____

have been added as additional insureds, but only with respect to their interest in the operations of the named insured, (excluding Automobile or Professional Liability policies.) Any deductible or self insured retention is the sole responsibility of the named insured.

If any Policy is cancelled or materially changed so as to reduce coverage during the period of coverage as stated above, so as to effect this certificate, thirty (30) days prior written notice, by registered mail, will be given by the Insurer to:

The Regional Municipality of Peel, 10 Peel Centre Dr., Brampton, ON L6T 4B9

ATTENTION: RISK MANAGEMENT

This certificate is executed and issued to the Regional Municipality of Peel on the date stated below.

Name and Address and Stamp of Insurance Broker				
Signature of Authorized Representative of Broker or Insurance Company	Executed and Issued	Yr.	Mo.	Day

Note: Proof of liability insurance will be accepted on this form only (with no amendments).

PERFORMANCE BOND **Appendix 7.4**

KNOW ALL MEN BY THESE PRESENTS THAT

_____ as Principal, hereinafter called the Principal, and _____ a Corporation created and existing under the laws of _____ and duly authorized to transact the business of Suretyship in the Province of Ontario, as Surety, hereinafter called the Surety, are held and firmly bound unto The Regional Municipality of Peel, as Obligee, hereinafter called the Obligee, in the amount of _____ Dollars ($_____) lawful money of Canada, for the payment of which sum, well and truly to be made, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally firmly by these presents.

WHEREAS, the Principal has entered into a written contract with the Obligee, dated the _____ day of _____, _____, for _____ in accordance with the Specifications and Drawings submitted therefore which Contract, Specifications and Drawings, are by reference made part hereof and are hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal shall promptly and faithfully perform the Contract then this obligation shall be null and void; otherwise it shall remain in full force and effect.

Whenever the Principal shall be, and declared by the Obligee to be, in default under the Contract, the Obligee having performed the Obligee's obligations thereunder, the Surety may promptly remedy the default, or shall promptly:

1. Complete the Contract in accordance with its terms and conditions or

2. Obtain a bid or bids for submission to the Obligee for completing the Contract in accordance with its terms and conditions, and upon determination by the Obligee and the Surety of the lowest responsible bidder, arrange for a contract between such bidder and the Obligee and make available as work progresses (even though there would be a default, or succession of defaults, under the contract or contracts of completion, arranged under this paragraph) sufficient funds to pay the cost of completion as well as other costs and damages for which the Surety may be liable hereunder, less the balance of the Contract price; but not exceeding the amount set forth in the first paragraph hereof. The term “balance of the Contract price”, as used in this paragraph, shall mean the total amount payable by the Obligee to the Principal under the Contract, less the amount properly paid by the Obligee to the Principal.

Any suit under this Bond must be instituted before the expiration of two years from the date on which the final payment under the Contract falls due.

The Surety shall not be liable for a greater sum than the specified penalty of this Bond.

NO right of action shall accrue on this Bond, to or for the use of, any person or corporation other than the Obligee named herein, or the heirs, executors, administrators, successors or assigns of the Obligee.

IN WITNESS WHEREOF, the Principal and the Surety have Signed and Sealed this Bond this _____ day of _____, _____.

SIGNED AND SEALED

_____ _____(Seal)
Principal Title

_____ _____(Seal)
Surety Title

Region of Peel
Working for you

Labour and Material Payment Bond

Bond Number _____ Project Number _____
Amount $_____ Contract Number _____

KNOW ALL MEN BY THESE PRESENTS, that we _____
_____ hereinafter called "the Principal",
and _____ hereinafter called "the Surety",
are jointly and severally held and firmly bound unto _____
_____, as Trustee, hereinafter called "the Obligee", for the use and benefit of the Claimants, their and each of their heirs, executors, administrators, successors and assigns, in the amount of _____
_____ Dollars (_____) of lawful money of Canada, for the payment of which sum well and truly to be made we the Principal and Surety jointly and severally bind ourselves, our and each of our respective heirs, executors, administrators, successors and assigns by these presents.

WHEREAS by an agreement in writing dated the _____ day of _____, 20__, the Principal entered into a contract with the Obligee, hereinafter called "the Contract", for

Which Contract is by reference herein made a part hereof as fully to all intents and purposes as though recited in full herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Principal shall make payment to all Claimants for all labour and material used or reasonably required for use in the performance of the Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. A Claimant for the purpose of this Bond is defined as one having a direct contract with the Principal for labour, material, or both, used or reasonably required for use in the performance of the Contract, labour and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment, directly applicable to the Contract provided that a person, firm or corporation who rents equipment to the Principal to be used in the performance of the Contract under a contract which provides that all or any part of the rent is to be applied towards the purchase price thereof shall only be a Claimant to the extent of the prevailing industrial rental value of such equipment for the period during which the equipment was used in the performance of the Contract.
2. The Principal and the Surety hereby jointly and severally agree with the Obligee, as Trustee, that every Claimant who has not been paid as provided for under the terms of his contract with the Principal, before the expiration of a period of 90 days after the date on which the last of such Claimant's Work or labour was done or performed or materials were furnished by such Claimant, may as a beneficiary of the trust herein provided for, sue on this Bond, prosecute the suite to final judgement for such sum or sums as may be justly due to such Claimant under the terms of his contract the Principal and have execution thereon. Provided that the Obligee is not obliged to do or take any act, action or proceeding against the Surety on behalf of the Claimants, or any of them, to enforce the provisions of this Bond. If any act, action or proceeding is taken either in the name of the Obligee or by joining the Obligee as a party to such proceeding, then such act, action or proceeding, shall be taken on the understanding and basis that the Claimants, or any of them, who take such act, action or proceeding shall indemnify and save harmless the Obligee against all costs, charges and expenses or liabilities incurred thereon and any loss or damage resulting to the Obligee by reason thereof. Provided still further that, subject to the foregoing terms and conditions, the Claimants or any of them, may use the name of the Obligee to sue on and enforce the provisions of this Bond.

3. No suit or action shall be commenced hereunder by any Claimant:
   (a) Unless such Claimant shall have given written notice within the time limits hereinafter set forth to each of the Principal, the Surety and the Obligee, stating with substantial accuracy the amount claimed;

   Such notice shall be served by mailing the same by registered mail, or served in any manner in which legal process may be served in the Province of Ontario, to the Principal and Surety at any place where an office is regularly maintained for the transaction of business by such persons, and to the Obligee addressed to the attention of the Regional Municipality of Peel, 10 Peel Centre Drive, Suite A, Fourth Floor, Brampton, Ontario, L6T 4B9. Such notice shall be given;
   (1) in respect of any claim for the amount or any portion thereof required to be held back from the Claimant by the Principal under either the terms of the Claimant's contract with the Principal or under the Construction Lien Act, R.S.O. 1990, c.C.30 applicable to the Claimant's contract with the Principal, whichever is the greater, within 120 days after such Claimant should have been paid in full under the Claimant's contract with the Principal.
   (2) In respect of any claim other than for the holdback, or portion thereof, referred to above, within 120 days after the date upon which such claimant did or performed the last of the Work or labour, or furnished the last of the materials for which such claim is made, under the Claimant's contract with the Principal.
   (b) After the expiration of one year following the date on which the Principal ceased Work on the Contract, including Work performed under the guarantees provided in the Contract.
   (c) Other than in a Court of competent jurisdiction in the Province of Ontario, and the parties hereto agree to submit to the jurisdiction of such Court.

4. The amount of the Bond shall be reduced by and, to the extent of any payment or payments made in good faith and in accordance with the provisions hereof, inclusive of the payment by Surety of claims under the Construction Lien Act, whether or not such claims be presented under and against this Bond.

PROVIDED ALWAYS and it is hereby agreed and declared that the Obligee and the Principal have the right to change, alter and vary the terms of the Contract, and that the Obligee may in its discretion at any time or times take and receive from the Principal any security whatsoever and grant any extension of time thereon or on any liability of the Principal to the Obligee.

PROVIDED FURTHER and it is hereby agreed and declared that the Principal and the Surety shall not be discharged or released from liability hereunder and that such liability shall not be in any way affected by any such changes, alterations, or variations, taking or receiving of security, or extension of time, as aforesaid, or by the exercise by the Obligee of any of the rights or powers reserved to it under the Contract or by its forbearance to exercise any such rights or powers, including (but without restricting the generality of the foregoing) any changes in the extent or nature of the Works to be constructed, altered, repaired or maintained under the Contract, or by any dealing, transaction, forbearance or forgiveness which may take place between the Principal and the Obligee.

PROVIDED FURTHER and it is hereby agreed and declared that the Surety shall not be liable for a great sum than that specified in this Bond.

IN WITNESS WHEREOF of Principal and the Surety have AFFIXED THEIR SIGNATURES AND CORPORATE SEALS this ___ day of _____, 20___.

SIGNED AND SEALED BY THE PRINCIPAL In the presence of	}	
_____ *Witness	}	Per: _____
_____ Occupation	}	Per: _____c/s Principal
_____ Address	}	Per: _____c/s Surety

*Not necessary if corporate seal is affixed.

HEALTH AND SAFETY COMPLIANCE CERTIFICATE

Contractors who provide services for the Region of Peel must agree to and abide by compliance with all Acts, Regulations, Codes and Regional Guidelines, pertinent to their project. This will include, but not be limited by, those items listed in Appendix "A".

- ***Notice of Project***

Section 6 of the Construction Regulations requires a Constructor to file this "Notice" with the Ministry of Labour. A valid copy will be given to the Project Engineer.

- ***W.H.M.I.S.***

All classified, hazardous substances must be identified with proper labels, have valid Material Safety Data Sheets (MSDS) and be used by workers who are trained in the proper use and handling of the substances(s).

- ***Transportation of Dangerous Goods***

Contractors must provide workers trained in proper storage and handling requirements, shipping and receiving of controlled substances. All vehicles transporting these substances must be appropriately placarded.

- ***Overhead Hazards***

Electrical Codes state distances of safe approach for "live" electrical lines when working beside or under cables. Aerial trespasses by material or equipment are not permitted.

- ***Fall Protection***

Workers shall be provided with protective devices where there is a possibility of falling 10 feet or more. Protection can include guard rails, safety harnesses or netting. Warning tape is not considered adequate protection.

- ***Health and Safety Program***

Contractors must be able to supply on demand a copy of their written Health and Safety Program including signed Policy and minutes of Health and Safety Committee meetings.

- ***Designated Substances***

Exposure limitations, monitoring requirements and controls for those substances listed in the Regulations must be strictly adhered to.

- ***Trenching, Shoring, Excavating***

Construction Regulations specifically state depths and types of trenches that require shoring and/or sloping.

- ***Confined Spaces***

Contractors shall ensure that a written program is developed, maintained and followed in accordance with the Regulations for Confined Spaces made under the Occupational Health and Safety Act, before a worker enters a confined space. A confined space is defined as a fully or partially enclosed space, that is not both designed and constructed for continuous human occupancy, and in which atmospheric hazards may occur because of its construction, location or contents, or because of the work that is performed within the space.

- ***Scaffolding***

Contractor will specify types of scaffolding to be used and provide logs of regular inspections and maintenance.

HEALTH AND SAFETY COMPLIANCE CERTIFICATE

♦ ***Personal Protective Equipment***

CSA approved safety footwear (green patch), headwear (Class B or better) and vests are deemed minimum standards. Other PPE shall be worn as required by the job being performed.
The Contractor must illustrate how they will provide necessary facilities as required by legislation. A reasonable supply of potable water must be maintained on site. One flushable facility must be made available for every fifteen or fewer workers.

♦ ***Electrical Work***

Only a licensed electrician or learner certified under the Apprenticeship and Tradesmen's Qualifications Act shall perform electrical work. Lockout and tagout procedures shall be specified in writing.

♦ ***Traffic Control***

Ministry of Transportation Guidelines for signing, roadmarking and use of traffic control persons must be followed.

♦ ***Service Contractors***

Includes telephone, hydro, cable, gas, water, sewage and other repair, installation or maintenance workers. The Contractor shall take appropriate steps to ensure that service personnel or project activities do not pose a hazard to either function and that the service workers are complying with established health and safety rules.

♦ ***Elevating Work Platforms***
Hoist, Rigging, Cranes

Contractors must provide upon demand, training records of staff operating said equipment and provide copies of current operating log books.

The Contractor must specify procedures for working alone, entry into, fire protection, rescue, facilities, communications and first aid. Requirements for lighting, shoring, hoistways and tunnel equipment are specified in the Construction Regulations. Explosives compliance is regulated by the federal government.

♦ ***Welding or Cutting***

Provisions for Fire Protection of Equipment and Property must be made.

♦ ***Formwork, Falsework, Reshoring***

Must be designed, examined and approved in writing by a Professional Engineer with allowable working load limits established, before concrete is placed.

SIGNATURE

_____
Contractor

_____
Date

APPENDIX "A" TO HEALTH AND SAFETY COMPLIANCE CERTIFICATE

This listing of Acts, Regulations and Codes is intended as a guide and in no way should be considered as all inclusive. Specific documents pertinent to the project should be established prior to work commencing. Should there be any doubts as to the interpretation of the wording found in the documents, then the Ministry of Labour or other affected agencies should be consulted. For a complete reference to regulations, recourse should be made to the Annual Consolidated Index to the Regulations of Ontario. Most publications are available from the Ministry of Labour bookstore at 880 Bay Street, Toronto, Ontario, M7A 2C7.

Suggested Site Postings

⇒ Health and Safety Policy and Procedures
⇒ Form 0082 - In All Cases of Injury
⇒ Occupational Health and Safety Act
⇒ Ministry of Labour Extracts
⇒ First Aid Regulation
⇒ Emergency Contact Numbers and Names

Suggested Documents

- Health and Safety Policy and Procedures Manual
- Occupational Health and Safety Act
  a) Industrial Establishments Regulations
  b) Construction Projects Regulations
- Critical Injury Defined
- Workplace Safety & Insurance Act
- First Aid Regulation
- Transportation of Dangerous Goods Act
- Designated Substance Regulation(s)
- Material Safety Data Sheets (available from suppliers)
- Electrical Code
- Ontario Fire Code 2787153.9
- Ministry of Transportation Guidelines for Traffic Control (Field Edition)
- Equipment Logs
- Staff Training Records
- Environmental Protection Act
- Employment Standards Act
- CSA Standards
- Energy Act
  Propane Storage, Handling & Utilization Code (O.Reg. 825/82)
- WHMIS

While your firm is performing work for the Agency, the Facility will remain open and accessible to the public and staff members. Your employees, suppliers, and sub-contractors must be made aware of the following list of rules to be followed while they are on the site.

1. The use of company facilities or equipment, (such as cafeteria, washrooms, electrical power, water, ladders, etc.) is not permitted unless otherwise specified or pre-approved by the Agency.

2. Inappropriate behaviour or offensive language will not be permitted.

3. Clothing considered to be offensive or unsuitable for a public building will not be worn by the Contractor's staff. Clothing prohibited by the Ministry of Labour Construction Safety Act will not be permitted.

4. People involved in operations where shoes and clothing are badly soiled (roofing, concrete work, demolition, etc.) shall refrain from entering any finished areas of the building.

5. The Agency has developed a Scent Sensitivity Program. Contractors are encouraged to be considerate of others and refrain from using or wearing scented products while at work or prior to coming to work on Regional sites.

6. All employees, suppliers, sub-contractors, or others on site representing the Contractor will be 18 years of age or older.

7. Earphones and electronic devices (such as iPods, mp3 players, etc.) are not permitted on site at any time.

8. A list of all Contractors' and Sub-contractors' personnel who will be on site shall be provided to the Agency upon request. All Personnel will sign in and out each time they arrive or leave the site.

9. The Contractor shall rope off or barricade all areas affected by work in progress where injury or inconvenience could occur to the public or the building staff. The installation and removal of ropes, barricades, and associated debris are the responsibilities of the Contractor.

10. Food and drink are not to be consumed in the building except in designated areas and subject to the restrictions listed above.

11. Smoking is not permitted within the building or within nine metres of any entrance.

12. Drugs and alcohol are not permitted on site.

13. Contractors' staff shall not park their vehicles in unauthorized parking areas. Designated areas for Contractors' parking, deliveries, storage, garbage bins, parking, etc. will be assigned by the Agency.

We / I have read and understand this document and will comply fully with all rules and regulations therein.

_____ _____

Contractor – Authorized Signing Officer **Date**

Region of Peel
Working for you

Appendix 7.8

ACCESSIBILITY REGULATIONS FOR CONTRACTED SERVICES

In accordance with Ontario Regulation 429/07, Accessibility Standards for Customer Service Sect. 6, every provider of goods and services shall ensure that every person who deals with members of the public or participates in the developing of the service providers policies, practices and procedures governing the provision of goods and services to members of the public, shall be trained on the following:

1. How to interact and communicate with persons with various types of disability.

2. How to interact with persons with disabilities who use assistive devices or require the assistance of a guide animal or a support person.

3. How to use equipment that is available on the premises that may help in the provision of goods or services.

4. What to do if a person with a particular type of disability is having difficulty accessing the provider's goods or services.

5. Information on the policies, practices and procedures governing the provision of goods and services to people with disabilities.

Contracted employees, third party employees, agents and others who deal with members of the public on behalf of the Region of Peel must meet the requirements of Ontario Regulation 429/07 with regard to training. A document describing the training policy, a summary of the contents of the training and details of training dates and attendees must be submitted to the Region of Peel upon request. If a training policy is not yet in place, cut and paste the following link into the computer's browser and complete the training module.

http://www.mcss.gov.on.ca/en/serve-ability/

I acknowledge the aforementioned accessibility regulations:

Company Name: _____ Date: _____

Authorized Official: _____

Signature Print Title

Region of Peel
Working for you

Accounts Payable Application For Vendor Direct Deposit

I hereby authorize the Region of Peel, through the Royal Bank of Canada, to deposit our payments to the bank account as indicated below. I will advise Accounts Payable of any change in this regard and the authorization is to remain in effect until I cancel it in writing with the sign off from two company officers.

Attach a cheque here (mark cheque "**Void**"):

233

233	99999	001	0002345611
⇩	⇩	⇩	⇩
Cheque Number	Branch	Bank Number	Account Number

Detailed Banking Information

Bank Name: _____

Address: _____

Bank Transit: _____ Bank Number: _____ Account Number: _____

Company Information

Company Name: _____

Company Mailing Address: _____

Receivable E-mail Address for EFT Payment Notification: _____

Company Officers

Name: _____	Name: _____
Title: _____	Title: _____
E-mail: _____	E-mail: _____
Phone Number: _____ - _____ - _____	Phone Number: _____ - _____ - _____
Fax Number: _____ - _____ - _____	Fax Number: _____ - _____ - _____
Signature: _____	Signature: _____

Date Requested: _____ / _____ / _____

When completed, send this application to Region of Peel

P.O. Box 458, Brampton, ON L6V 2L4 905-791-7800 Ext. 4284

Tender

Document 2013-714T

SUBMISSION LABEL

Do Not Open
Before Opening Time

The Regional Municipality of Peel
Purchasing Division

10 Peel Centre Dr., Ste A, 1st Fl, Rm 101
Brampton, ON L6T 4B9

From: _____

_____

_____

_____

Description: INTERIOR RENOVATION OF REGION OF PEEL PUBLIC HEALTH CLINIC AT 7205 GOREWAY DRIVE, MISSISSAUGA

Closing Date: _____

12:00 Noon

Region of Peel
Working for you

Please complete, cut out, and affix this label to the front of your sealed envelope for submission.

DESIGNATED SUBSTANCES SURVEY

BASEMENT UNITS B7 and B8B at the Westwood Mall

REPORT

July 29, 2013

DESIGNATED SUBSTANCES SURVEY

Basement Units B7 and B8B at the Westwood Mall

Submitted to:
Mr. Barry Kelly
Fieldgate Commercial Properties
5400 Yonge Street, 5th Floor
Toronto, Ontario
M2N 5R5

Report Number: 13-1187-0157
Distribution:

2 Copies (1 Electronic) - Fieldgate Commercial Properties

2 Copies - Golder Associates Ltd.

Golder Associates

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1.0 INTRODUCTION

Fieldgate Commercial Properties (the Client) retained Golder Associates Ltd. (Golder) to complete an intrusive survey for designated substances and select hazardous materials in the basement units B7 and B8B at The Westwood Mall, 7205 Goreway Drive, Mississauga, Ontario (the Site). The survey was conducted on July 12, 2013 by Mr. Jeff Hunt of Golder's Environmental Health and Safety Group.

The survey was performed with the objective of identifying designated substances, as required under the Ontario Occupational Health and Safety Act, which may be disturbed during proposed renovations and to provide recommendations to manage these materials in accordance with provincial regulations and guidelines. The designated substances survey included asbestos-containing materials (ACM), lead, mercury, and silica. The remaining designated substances, acrylonitrile, arsenic, benzene, coke oven emissions, ethylene oxide, isocyanates and vinyl chloride, were not anticipated to be present at the Site and were therefore not included in the survey. In addition, the presence of select hazardous materials including ozone depleting substances (ODS), polychlorinated biphenyls (PCBs) and mould were assessed.

2.0 SCOPE OF WORK

The Scope of Work involved conducting an intrusive building materials survey at the Site to:

- identify designated substances and other selected hazardous materials present at the Site;
- conduct representative bulk sampling of materials suspected of containing asbestos and paint suspected of containing lead, to supplement observations;
- complete analysis of bulk samples for asbestos type / percentage or lead content; and,
- provide a report detailing the findings and any recommendations with respect to management of any identified designated substances, ODS, PCBs, or mould identified as being present on Site.

3.0 REGULATIONS, GUIDELINES AND STANDARDS

3.1 Occupational Health and Safety Act

The *Ontario Occupational Health and Safety Act* (the *Act*), R.S.O. 1990 (as amended) defines and regulates designated substances that may be present within buildings. Section 30 of the *Act* requires that, prior to beginning a construction project (including building renovation), a document summarizing the presence of these materials must be available to contractors and subcontractors requesting tenders.

3.2 Asbestos-Containing Materials

Ontario Regulation 278/05 - Asbestos on Construction Projects and in Buildings and Repair Operations, as amended (O. Reg. 278/05), made under the *Act,* prescribes specific procedures for the identification of ACM and protocols for their removal. Under this regulation, if ACM are suspected to be present or ought reasonably to be suspected, locations of the materials must be documented. Prior to a renovation project, a document detailing the presence of all ACM must be available to contractors and subcontractors requesting tenders. All ACM must be removed or managed appropriately prior to any disturbance caused by the construction process in accordance with provincial regulations.

Ontario Regulation 347/90 - General Waste Management, as amended (O. Reg. 347/90), made under the *Environmental Protection Act*, prescribes requirements for general waste management including ACM. The regulation defines "asbestos waste" as "solid or liquid waste that results from the removal of asbestos-containing construction or insulation materials, or the manufacture of asbestos-containing products, and contains asbestos in more than a trivial amount or proportion". Asbestos waste must be disposed of in a licensed waste facility which has been properly notified of the presence of asbestos waste.

3.3 Lead

Lead was used as a pigment and drying agent in alkyd oil-based paint. Lead is also present in some rechargeable batteries, such as those used in some emergency lighting systems. Ontario Regulation 490/09 - Designated Substances, as amended (O. Reg. 490/09) made under the *Act*, prescribes requirements relating to the control of potential exposure to lead-containing materials in the workplace, where lead is present, produced, used, handled or stored and at which the worker is likely to be exposed to lead.

If operations that will likely produce airborne lead dust or fumes (e.g. during welding, torch cutting, sanding and sand blasting) are to occur during building renovation or construction, it is recommended that the disturbance of lead paint be carried out in accordance with procedures outlined in the Ontario Ministry of Labour (MOL) Guideline - Lead on Construction Projects dated September 2004 (updated April 2011).

The MOL currently does not include criteria for classification of lead paint, and allows for no minimum concentration of lead in paint to be acceptable as non-lead containing. Therefore in these circumstances, Golder considers all paints with any detectable presence of lead as lead-containing paint (LCP). The accepted laboratory testing methods for determination of lead in paint is either flame atomic absorption spectroscopy (FAAS), or inductively coupled plasma/atomic emission spectroscopy (ICP-AES).

3.4 Mercury

Mercury is regulated under O.Reg.490/09. This regulation prescribes occupational exposure limits (OELs) and requirements for engineering controls, work practices and hygiene practices and facilities to protect workers who may be potentially exposed to mercury.

If elemental mercury is spilled, the beads and droplets can accumulate and emit colorless and odourless vapours. These vapours may present a health risk to workers. Light bulbs and tubes, if broken, may pose an occupational hazard to unprotected workers.

3.5 Silica

Silica is a naturally occurring mineral and may be found in common aggregates in concrete mortar, brick and ceiling tiles, and is likely present in the concrete and mortar used to construct the Site. Silica is also regulated under O. Reg. 490/09. This regulation prescribes OELs and requirements surrounding engineering controls, work practices and hygiene practices and facilities to protect workers who may be potentially exposed to crystalline silica (cristobalite, quartz and tripoli).

The health risks associated with exposure to silica is due primarily to the inhalation of respirable crystalline silica, particularly in the form of dust associated with the abrading or cutting of silica containing materials.

As prescribed under O. Reg. 490/09, an employer shall take all reasonable precautions to prevent worker exposure to crystalline silica. Procedures for workers involved in construction activities occurring on a Site

where silica is disturbed are outlined in the MOL Guideline - Silica on Construction Projects dated September 2004 (updated April 2011).

3.6 Polychlorinated Biphenyls

PCBs were used as a dielectric fluid in electrical equipment such as transformers, light ballasts and capacitors. The use of PCBs in fluorescent lamp ballast capacitors was common up to 1980. The Polychlorinated Biphenyls Regulation (SOR/2008-273), prohibits and restricts the use of PCBs pertaining to the manufacture, export, import, sale, and or processing of PCBs and PCB-containing products.

SOR/2008-273 prescribes requirements pertaining to the handling, storage and disposal of PCBs and PCB-containing equipment. Revisions to the federal regulation have provided end-of-use deadlines for liquids containing PCBs, as well as PCBs in specified equipment. The first such deadline was December 31, 2009, by which time all equipment containing PCBs at concentrations greater than 500 mg/kg, and equipment within 100 metres of specified sensitive locations and containing PCBs at concentrations greater than 50 mg/kg, must have been phased out of use. These deadlines exclude PCB-containing light ballasts, and pole-mounted transformers.

3.7 Ozone-Depleting Substances

In 1998, the federal government enacted the Ozone Depleting Substances Regulations (SOR/99-7), to amend controls on production and consumption of chlorofluorocarbons (CFC), halons, tetrachloride and methyl-chloroform. The Federal Halocarbon Regulations (SOR/2003-289), was enacted to ensure uniformity with respect to the release, recovery and recycling of ODS and their halocarbon alternatives in refrigeration and air conditioning. The regulation also requires that permits be obtained to import or export used, recovered, recycled and reclaimed ODS.

Equipment containing ODS should be removed by a licensed contractor and handled in accordance with the Code of Practice for the Reduction of CFC Emissions from Refrigeration and Air Conditioning Systems, updated in 2008 and Ontario Regulation 463/10 - Ozone Depleting Substances and other Halocarbons, (O. Reg. 463/10). ODS are often present in refrigerators and freezers, vending machines (refrigerated) and in water fountains/water coolers and air conditioning systems.

3.8 Mould

There are no specific regulations in Ontario addressing mould contamination. However, according to the Environmental Abatement Council of Ontario (EACO)[1] guidelines on assessment and remediation of fungi in indoor environments, building materials supporting mould growth should be remediated in order to ensure a healthy environment. Remediation of mould growth is based on an approximation of the extent of visible mould growth including the estimated extent of any hidden mould growth. Typical industry guidelines describe three levels of work practice; Small- Level 1, Medium- Level 2 and Large- Level 3. The thresholds between Small and Medium (1 m^2 or 10 ft^2) and between Medium and Large project areas (10 m^2 or 100 ft^2) are guidelines only and

[1] Mould Abatement Guidelines 2004, Environmental Abatement Council of Ontario, 2004

are subject to professional judgment. Repair of the defects that led to water accumulation should be conducted in conjunction with or prior to the remediation.

The basic principles of proper water damage restoration practice and mould remediation procedures to be followed, and the precautions to be observed, are described in the Standards for Professional Water Damage Restoration S500-2006[2] and Reference Guide for Professional Mould Remediation Restoration S520-2008[3], issued by the Institute of Inspection, Cleaning and Restoration Certification (IICRC).

4.0 METHOD

The Site was investigated for suspected ACM; LCP; mercury in thermostats, pressure sensing devices, and light bulbs; PCBs in fluorescent light ballasts; ODS in items or systems such as refrigerators and air conditioning units; mould and other hazardous materials. Silica will be present in common aggregates and concrete, as noted below. The remaining designated substances are not expected to be present at this Site due to the use of the building. Site work was completed in accordance with the *Act*, regulations under the *Act*, and other standards, guidelines, and practices applicable to this location.

4.1 Asbestos-Containing Materials

Readily available information was gathered regarding the building including age, type of structure, presence of renovated areas or additions, and any details regarding the building mechanical systems. The building systems reviewed as part of this investigation included mechanical systems, structural components, and architectural finishes and materials.

The areas surveyed were visually inspected on an area-by-area basis in order to identify the locations of potential ACM. Bulk samples were collected of materials suspected of containing asbestos for confirmation purposes.

Homogeneous materials sampling was utilized during the course of the investigation. The bulk material sampling was completed on homogeneous materials that are uniform in color, texture, and installation or construction date. As per "Table 1" of O. Reg. 278/05, a minimum of three samples per homogeneous material were collected and submitted to EMC Scientific Inc. (EMC) for analysis to determine asbestos type and percentage content, in accordance with U.S. Environmental Protection Agency (USEPA) Method EPA/600/R-93/116, as prescribed under O. Reg. 278/05.

4.2 Lead

Systematic sampling and visual identification of suspected LCP were completed as part of the survey. Samples of suspected LCP were collected and submitted to EMC for analysis in accordance with the American Society for Testing and Materials (ASTM) Method D3335-85A. This method is derived from the USEPA SW 846 Method 3050B where each sample is digested, diluted and analyzed by FAAS.

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[2] ANSI/IICRC S500 - Standard and Reference Guide for Professional Water Damage Restoration, Institute of inspection Cleaning and Restoration, 2006

[3] ANSI/IICRC S520 - Standard and Reference Guide for Professional Mould Remediation, Institute of inspection Cleaning and Restoration, 2008

An inventory was made of the other known or suspected lead-containing materials (i.e. batteries for emergency lights) based on visual observations, where noted.

4.3 Mercury

Elemental mercury may be present in thermostats and trace amounts of mercury vapour may be present in metal halide light bulbs and fluorescent light tubes. As such, a review of potential mercury-containing equipment installed at the Site was completed as part of the survey, such that any mercury-containing switches, light bulbs, thermostats (switch bulbs) and pressure-sensing devices were noted, if observed.

4.4 Silica

Surveying for silica-containing materials consists of conducting a visual assessment for concrete products, mortar, and brick at a given Site and recording the observations. As these materials are presumed to contain silica, no sampling of these materials is conducted.

4.5 Ozone-depleting Substances

A review of thermostats, refrigeration and air conditioning units was completed to verify the presence of ODS such as refrigerants R-11, R-12 and R-22. The presence of refrigerants was determined by gathering an inventory of all observed air conditioning and refrigeration units.

4.6 Polychlorinated Biphenyls

The Site was visually assessed for the presence of PCBs in fluorescent light ballasts. No other equipment suspected of containing PCBs was observed during the investigation. The presence of PCBs in the ballasts could not be confirmed at the time of Site visit, as all electrical was still active and therefore excluded from inspection for health and safety purposes. No PCB sampling was conducted during the Site visit.

4.7 Mould

The assessment was conducted in general accordance with Health Canada and American Conference of Governmental Industrial Hygienists (ACGIH) protocols for microbiological assessment and control. Destructive testing or intrusive investigation techniques were not used by Golder as part of this investigation, as no evidence suggested that mould contaminated building materials may have been present in concealed locations.

The visual assessment included a review of readily accessible areas at the Site, which included floors, walls, and ceilings for evidence for obvious or suspect mould growth on building materials.

4.8 Other Hazardous Materials

Other hazardous materials include acrylonitrile, arsenic, benzene, coke oven emissions, ethylene oxide, isocyanates, and vinyl chloride. None of these substances were expected to be present as significant constituents of the building materials and architectural finishes and, as such, no specific observations or sampling of materials potentially containing these substances was included as part of this survey and will not be discussed further in this document.

5.0 RESULTS AND DISCUSSION

5.1 Asbestos

A total of 11 samples representing three distinct homogeneous building materials were collected and submitted for asbestos content analysis. Materials sampled included: vinyl floor tile, drywall joint compound and ceiling tiles.

Based on the laboratory certificate of analysis, the following materials were confirmed to be asbestos-containing:

- Beige 12" X 12" vinyl floor tile with black mastic (Sample 1 A-C), collected from Unit B7. The non-friable vinyl floor tile was found to contain 2% chrysotile asbestos while the associated mastic did not contain any asbestos. The exact quantity of tiles is unknown, as the tile was found to be present in several locations beneath glued down carpet. It is therefore presumed that the tile is likely present throughout the Site. There was approximately 175 square metres of glue down carpet present in both unit B7 and B8B. Where observed, the floor tiles were noted to be in good condition.
- Drywall joint compound (Sample 2 B, D and E) was found on the walls throughout both units. The drywall joint compound was found to contain 0.5-1% chrysotile asbestos and was noted to be in good condition. There was approximately 600 square metres present between the two units.

The following sampled materials were found to be non-asbestos-containing:

- 2' X 4' ceiling tiles with medium pinholes and horizontal fissures (Sample 3 A-C) present throughout both units.

Updated Site Drawings can be found in Appendix A. The Laboratory Certificate of Analysis for asbestos results is provided in Appendix B.

5.2 Lead

A total of two samples of painted surfaces were collected from the Site and submitted to EMC for lead content analysis. As discussed in Section 3.3 above and based on the analytical results, neither of the samples listed below was found to contain a detectable presence of lead:

- Cyan paint (Sample LP-01 throughout Unit B7); and,
- Yellow paint (Sample LP-02) throughout Unit B8B.

In addition to the above, lead is suspected to be present in two emergency batteries in the emergency exit signs found in each unit.

The Laboratory Certificate of Analysis for lead is presented in Appendix C.

5.3 Mercury

Fluorescent light tubes at the Site are known to contain small amounts of mercury vapour. Approximately 168 fluorescent light tubes were observed. No other mercury-containing devices were noted.

5.4 Silica

Silica is suspected to be present in concrete and concrete products (mortar, concrete block, etc.) throughout the Site. No samples of these materials were collected.

5.5 Ozone Depleting Substances

No suspect ODS were observed during the site investigation.

5.6 Polychlorinated Biphenyls

Approximately 84 light fluorescent ballasts were suspected to be present. Four representative ballasts were accessed during the site investigation and were found to not contain PCBs. The remaining ballasts are presumed to be of the same construction installation era.

5.7 Mould

Throughout the course of the investigation, mould was not observed in any of the assessed areas at the Site. Water damage was also not observed in any of the assessed areas at the site.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Asbestos

Through Site investigation and laboratory analytical testing, asbestos was confirmed to be present in the vinyl floor tiles and drywall joint compound located in both units. Based on the Site observations and laboratory results, the following recommendations are made in accordance with the requirements of O. Reg. 278/05:

1) Drywall joint compound was found throughout both units. Based on the variety of the sample results ranging from 0%-1% chrysotile asbestos content, all drywall located in both units should be presumed to contain asbestos containing drywall joint compound. The compound was noted to be in good condition and can be managed in place. Prior to any renovations that may disturb this material, the drywall joint compound should be removed following Type 2 asbestos work procedures as prescribed under O. Reg. 278/05.

2) Non-friable vinyl floor tiles were found to be in good condition and can be managed in place. Prior to proposed renovation activities that may result in disturbance of the vinyl floor tiles, they should be removed following Type 1 asbestos work procedures, as prescribed under O. Reg. 278/05.

3) The quantities of ACM as reported are estimates only and may not accurately reflect the exact quantities at the Site. Contractors retained to complete asbestos abatement activities should independently confirm the reported quantities.

4) All persons working in close proximity to confirmed or suspect ACM and who may disturb the ACM in the course of their work must be advised of the presence of the ACM and the required precautions as prescribed under O. Reg. 278/05.

5) If suspected ACM not identified in this report are encountered during proposed renovation activities, the work should stop immediately and the material tested to determine asbestos content. This would be executed in order to provide recommendations on the applicable work procedures as prescribed under O. Reg. 278/05. There is a possibility that additional concealed materials not identified or known may

become apparent during renovation activities. Based on this, it is Golder's opinion that a contingency be carried for all renovation work to allow for the identification and abatement of previously unidentified materials. In addition, contractors retained to work on this project should be notified of this limitation and written procedures should be established in case additional materials are identified. The overall objective is to minimize exposure during the proposed renovations.

6.2 Lead

As stated above, the MOL currently does not have criteria for the classification of lead-based paint, and therefore, under these circumstances, Golder considers all painted surfaces with any detectable presence of lead to be lead-containing. Based on this, and the laboratory certificate of analysis, Golder considers the sampled paints to be non-lead containing.

Lead is suspected to be present in the emergency exit signs. All bulk lead-containing materials should be extracted and sent to a recycling facility. If recycling of the lead is not practicable then it must be disposed of in an approved landfill as lead waste.

6.3 Mercury

Mercury is suspected to be present in fluorescent light bulbs located throughout the Site. It is recommended that at the time of their disposal, mercury containing items be recycled or reused by qualified personnel or may be disposed of in accordance with procedures specified by federal and provincial regulations.

6.4 Silica

Sampling for the presence of crystalline silica was not conducted during this assessment. However, silica is suspected to be present in the concrete and cement block used to construct the building. During proposed renovations, it is recommended that materials suspected to contain silica are routinely misted with water to control airborne dust levels, thereby preventing worker and public exposure to silica. Any work involving silica should be completed in accordance with the MOL Guideline - Silica on Construction Projects (updated April 2011). Workers in the immediate vicinity or having the potential to become exposed to airborne silica should be provided with the appropriate respiratory protection.

6.5 Ozone-Depleting Substances

No ODS were observed during the survey.

6.6 Polychlorinated Biphenyls

While a limited number of light ballasts were confirmed to be non-PCB containing, for confirmation purposes prior to disposing of light ballast, all light ballasts must be checked and compared to the Environment Canada Report EPS 2/CC/2 (revised) August 1991, Identification of Lamp Ballasts Containing PCBs. Ballasts clearly identified as "Non-PCB" or "PCB-Free" can be recycled or disposed of as regular construction waste. All other ballasts must be identified by the markings, date code, model and serial number to confirm the presence of PCBs.

6.7 Mould

Mould was not observed to be present in the areas assessed at the Site. Should mould be encountered or discovered at any time, mould-impacted building materials should be remediated/removed following appropriate

recommended procedures as outlined in the Reference Guide for Professional Mould Remediation Restoration S520-2008, issued by the IICRC.

6.8 Other Hazardous Materials

Based on the survey, the following materials were not suspected to be present in the investigated areas at the Site:

- Acrylonitrile;
- Benzene;
- Coke Oven Emissions;
- Ethylene Oxide;
- Isocyanates; and,
- Vinyl Chloride.

7.0 LIMITATIONS

This report was prepared for the use of Fieldgate Commercial Properties. This report is based on data and information collected during a Site visit conducted by Golder and is based solely on Site conditions encountered at the time of the survey, supplemented by historical information and data obtained by Golder as described in this report.

The conclusions and recommendations contained in this report are based upon professional opinions with regard to the subject matter. These opinions are in accordance with applicable and currently accepted occupational health and safety or environmental assessment standards and practices applicable to these locations and are subject to the following inherent limitations:

- The data and findings presented in this report are valid as of the date of the investigation. The passage of time, manifestation of latent conditions or occurrence of future events may warrant further exploration at the properties, analysis of the data, and re-evaluation of the findings, observations, and conclusions expressed in this report;
- Additional hazardous building materials not identified in this report may become evident during proposed renovations. Should additional information become available, Golder requests that this information be brought to our attention so that we may re-assess the conclusions presented herein;
- Golder will not be responsible for any real or perceived decrease in a property value, its saleability or ability to gain financing through the reporting of information in this report;
- Golder's report presents professional opinions and findings of a scientific and technical nature. While attempts were made to relate the data and findings to applicable environmental and occupational health and safety laws and regulations, the report shall not be construed to offer legal opinion or representations as to the requirements of, nor compliance with, environmental and occupational health and safety laws, rules, regulations or policies of federal, provincial, or local governmental agencies. Any use of this assessment report constitutes acceptance of the limits of Golder's liability. Golder's liability extends

only to its client and not to other parties who may obtain this assessment report. Issues raised by the report should be reviewed by appropriate legal counsel;

- In evaluating the Site conditions, Golder has relied in good faith on information provided by others. We accept no responsibility for any deficiency, misstatements or inaccuracies contained in this report as a result of omissions, misinterpretations or fraudulent acts of the persons involved;
- The quantities of identified designated substances noted herein are estimated quantities for reporting purposes, and this report is limited in that regard. In the event that designated substances are scheduled to be removed in the future, it is solely the responsibility of the contractor to confirm the exact quantities of designated substances to be removed, prior to their removal;
- This report is of a summary nature and is not intended to stand alone without reference to the instructions given to Golder by the Client, communications between Golder and the Client, and to any other reports prepared by Golder for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. Golder cannot be responsible for use of portions of the report without reference to the entire report;
- Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the management of identified materials. Contractors bidding on, or undertaking any work should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how concealed conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities; and,
- Special risks occur whenever engineering or related disciplines are applied to identify Site conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain Site conditions. The conditions that Golder interprets to exist between and beyond investigation and sampling points may differ from those that actually exist.

8.0 CLOSURE

If you have any questions or require any further information, please feel free to contact the undersigned at (905) 567-4444. Thank you for the opportunity to be of service. We look forward to working with you again.

Report Signature Page

GOLDER ASSOCIATES LTD.

Jeff Hunt (Dipl. (Eco. Mgmt.))
Environmental Health & Safety Consultant
Environmental Health & Safety Group

Robert Stoyanoff, BTech MBA CChem CIH.
Senior Industrial Hygienist
Environmental Health & Safety Group

JH/RS:kc

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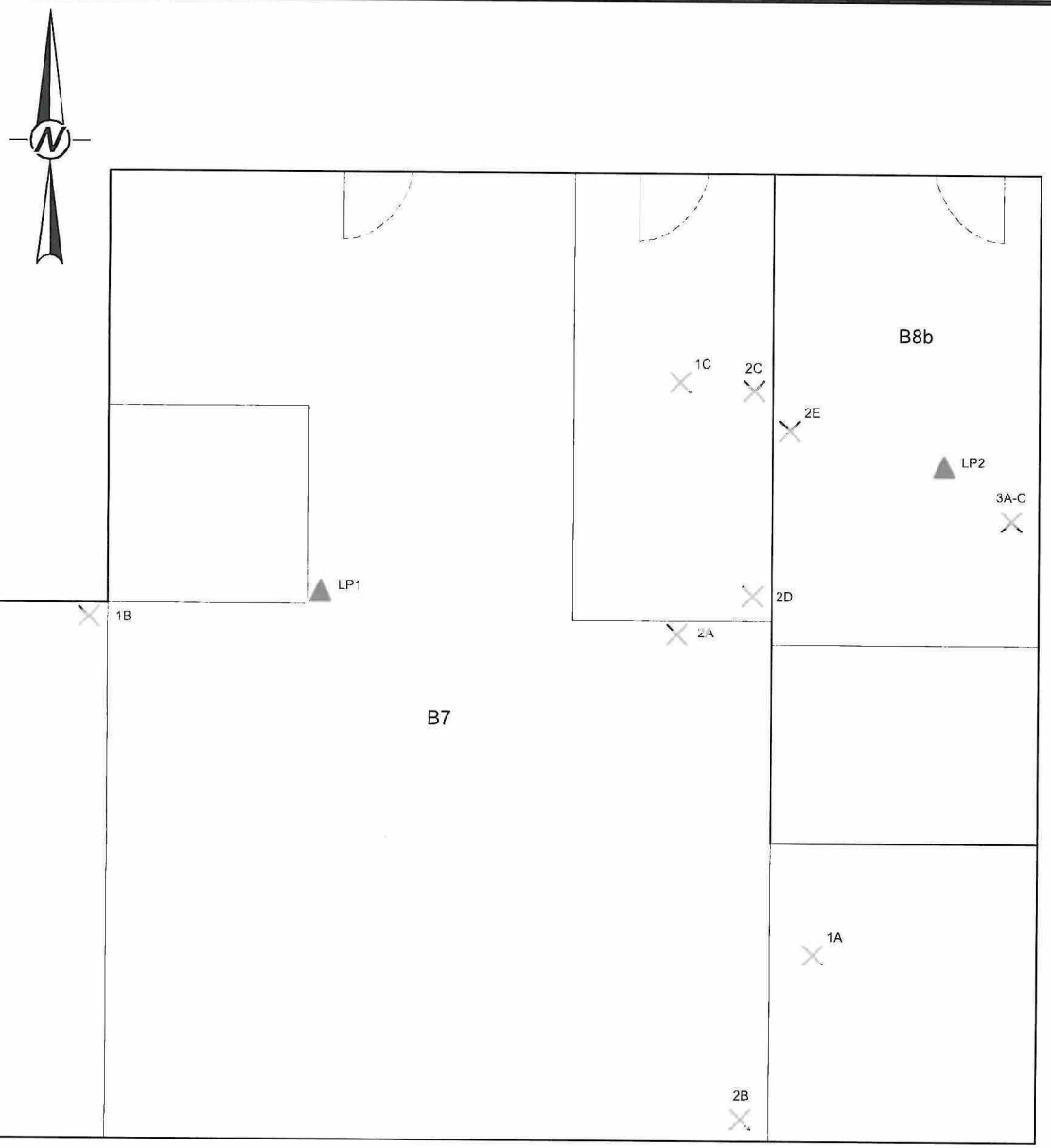
\\golder.gds\gal\mississauga\active\2013\1187\13-1187-0157 fieldgate-dss-westwoodmall\reports\13-1187-0157 fcp basement units at the westwoood mall 7205 goreway drive report 29jul13.doc

APPENDIX A

Site Drawings

Project:\13-1187-0157 (FDI Mississauga)\AA- Designated Substances And Hazardous Material Survey\1311870157AA001.dwg | Layout: 1311870157AA001 | Modified: DDojcinovic 07/24/2013 11:53 AM | Plotted: DDojcinovic 07/24/2013



LEGEND

- ACM SAMPLE LOCATION
- LEAD SAMPLE LOCATION

0 0.4 0.8 1.2

SCALE METRES

PROJECT

FIELDGATE DEVELOPMENT INC.
DESIGNATED SUBSTANCES AND
HAZARDOUS BUILDING MATERIAL SURVEY

TITLE

BASEMENT UNITS B7 AND B8b
WESTWOOD MALL BASEMENT
7205 GOREWAY DRIVE, MISSISSAUGA, ON

Golder Associates

PROJECT No.		13-1187-0157	FILE No.	1311870157AA001
DESIGN			SCALE	NOT TO SCALE
CADD	DD	2013-07-24	FIGURE	
CHECK	CB	2013-07-24		1
REVIEW	GM	2013-07-24		

APPENDIX B

Laboratory Certificate of Analysis - Asbestos

emc scientific
INCORPORATED

Laboratory Analysis Report

To:

Jeff Hunt
Golder Associates Ltd.
6925 Century Avenue, Suite 100
Mississauga, Ontario
L5N 7K2

EMC LAB REPORT NUMBER: A11092
Job/Project Name: West mall / ACM
Analysis Method: Polarized Light Microscopy – EPA 600
Date Received: Jul 17/13 **Date Analyzed:** Jul 19/13
Analyst: Banu Gurgen-Keough, *Laboratory Manager*

Job No: 13-1187-0157
Number of Samples: 11
Date Reported: Jul 23/13

Client's Sample ID	Lab Sample No.	Description/Location	Sample Appearance	SAMPLE COMPONENTS (%)			
				Asbestos Fibres		Non-asbestos Fibres	Non-fibrous Material
1A	A11092-1	12x12 Vinyl floor tile	2 Phases: a) Beige, vinyl floor tile b) Black, mastic	**Chrysotile** ND	**2**		98 100
1B	A11092-2	12x12 Vinyl floor tile	NA				
1C	A11092-3	12x12 Vinyl floor tile	NA				
2A	A11092-4	Drywall joint compound	White, drywall compound	ND			100
2B	A11092-5	Drywall joint compound	Non-homogeneous, off-white, drywall compound	**Chrysotile**	**0.5**		99.5
2C	A11092-6	Drywall joint compound	white, drywall compound	ND			100
2D	A11092-7	Drywall joint compound	Non-homogeneous, off-white, drywall compound	**Chrysotile**	**0.5**		99.5
2E	A11092-8	Drywall joint compound	Non-homogeneous, off-white, drywall compound	**Chrysotile**	**1**		99
3A	A11092-9	2x4 Ceiling tile	Beige, ceiling tile	ND		70	30
3B	A11092-10	2x4 Ceiling tile	Beige, ceiling tile	ND		70	30
3C	A11092-11	2x4 Ceiling tile	Beige, ceiling tile	ND		70	30

Note:
1. Bulk samples are analyzed using Polarized Light Microscopy (PLM) and dispersion staining techniques. The analytical procedures are in accordance with EPA 600/R-93/116 method.
2. The results are only related to the samples analyzed. **ND** = None Detected, **NA** = Not Analyzed (analysis stopped due to a previous positive result).
3. The Ontario Regulatory Threshold for asbestos is 0.5%.

APPENDIX C

Laboratory Certificate of Analysis - Lead

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B13-18463

Report To:

EMC Scientific Inc.
5800 Ambler Dr. #100,
Mississauga ON L4W 4J4 Canada
Attention: Alister Haddad

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 18-Jul-13
DATE REPORTED: 19-Jul-13
SAMPLE MATRIX: Paint Chips

JOB/PROJECT NO.: West Mall / ACM
P.O. NUMBER: 13-1187-0157
WATERWORKS NO.

	Parameter		Lead				
	Units		µg/g				
	M.D.L.		5				
	Reference Method		EPA 6010				
	Date Analyzed/Site		19-Jul-13/O				
Client I.D.	Sample I.D.	Date Collected					
LP #1 - Cyan Paint	B13-18463-1	13-Jul-13	< 5				
LP #2 - Yellow Paint	B13-18463-2	13-Jul-13	< 5				

K Pipin

Krystyna Pipin , M. Sc.
Lab Supervisor

M.D.L. = Method Detection Limit
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

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